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Midwest Engineer

SERVING THE ENGINEERING PROFESSION

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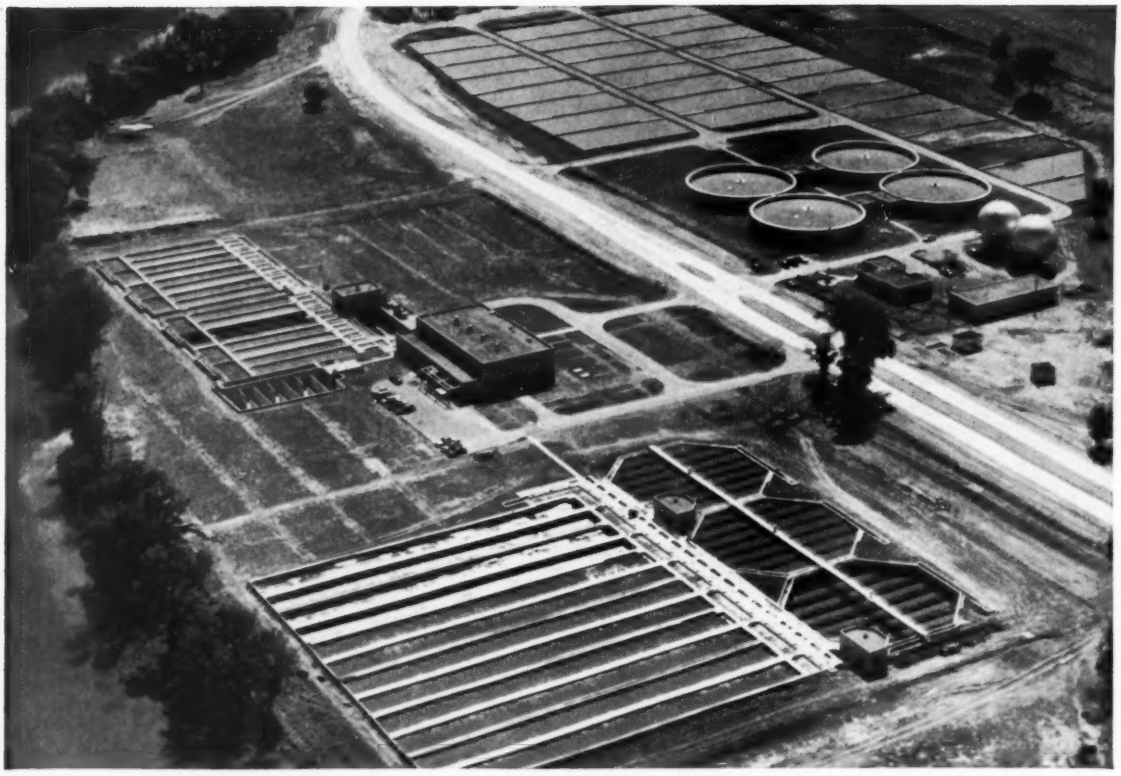
NEW SIGHTS FOR ENGINEERS — PAGE FIVE

Vol. 12 SEPTEMBER, 1959 No. 2



South Bend Sewage Treatment Plant located on the St. Joseph River. The four PFT Floating Covers can be seen in the background. Consoer, Townsend and Associates, Chicago, Consulting Engineers.

South Bend restores beauty and recreational facilities to the St. Joseph River

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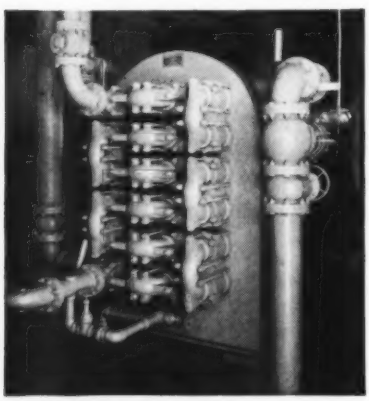

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Midwest Engineer

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WESTERN SOCIETY OF ENGINEERS

Serving the Engineering Profession

September, 1959 Vol. 12, No. 2

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Bacon's Magazine Clipping Bureau was established in 1932 to render a highly specialized service to American Business in the fields of publicity and public relations work. However, the fields of competitive advertising and subject research were soon added.

Today, nearly 2000 business organizations use the coverage of over 3,500 magazines provided by Bacon's. Only original clippings are sent to all clients —no reproductions of any kind are considered satisfactory by Bacons, since many organizations make their own reproductions for specialized uses, and double reproductions would be of extremely poor quality.

Bacon's reading list is published as Bacon's Publicity Checker, where the 3,500 magazines are broken down into 99 market classifications. These classifications cover all of the business, trade, technical, consumer and farm magazines that have any possible interest to business. The Checker is sold separately as indicated in the adjoining listing.

Here are the Basic Services:

PUBLICITY—A publicity order for Bacon's Clipping Service automatically gives a customer complete clippings of every item in which his name is mentioned in any of the magazines on the list. Thus all of a clients news release publicity is checked and all editorial material concerning him is picked up.

COMPETITIVE PUBLICITY—Companies frequently order clippings of competitors' publicity. Items may be on new equipment, new installations, personnel changes, etc. These clippings make it possible to keep abreast of activities of competitors and compare placement with competition.

COMPETITIVE ADVERTISING—The Bureau also offers service to business by clipping competitor's advertising. The broad coverage insures a complete file on advertising themes and trends. It also helps avoid duplication of themes.

RESEARCH—Many of the Bureau's clients use the research service to get all published information on a wide variety of subjects. This research service has proved its worth over and over again. Business lives on information and the Bureau provides an economical way of obtaining it.

For the most part, Bacon's Clipping Services have been channeled through Advertising, Publicity and Public Relations Agencies and the Advertising and Public Relations Departments of Business organizations. However, the growing interest in research studies are now bringing the Engineering and Research Departments into an increasingly important phase of the Bacon Service.

CLIPPINGS FOR ENGINEERS—This message is therefore designed to call attention to the importance of the Bacon services to engineers, whether it be in connection with design, selection of materials, production methods, application, maintenance and market and product analysis from the engineering viewpoint.

Clippings for engineers cover both advertising and editorial material. The research subjects below represent only a small sample of the material being produced at Bacon's:

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It is amazing how many important clippings are turned up in these research studies at Bacon's and at a nominal cost.

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We shall be pleased to send you a complimentary copy on request.

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This is our reading list. Coded by editors to show publicity used in over 3500 business, farm and consumer magazines in 99 market groups. Invaluable for making release lists. Assures sending each editor material he desires. Spiral bound fabricoid, 6¼" by 9½"—352 pages. $20.00. Sent on approval. 1960 Edition out Nov. 1, 1959.

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In the quiet of the summer your WSE Headquarters was a Beehive of Activity and Planning and now,

Western Again Moves Forward

Although the WSE headquarters was closed for the summer as far as members' activities were concerned, there was actually more going on from a management standpoint than in any previous summer. Final production of the August Directory issue of Midwest Engineer, the interviewing of candidates for the position of Secretary, program planning for the coming year, final arrangements for the dining room services, remodeling of the fifth floor dining room and the entrance to 6th floor, and a complete redecorating and cleaning program kept the management committee hustling and the WSE staff working overtime.

The big news for August was the announcement by letter on August 24 of the appointment of the new secretary whose photograph is shown on the front cover. Here is the news release which went out to the newspapers and some 60 magazines which have an interest in the activities of WSE:

Fred R. Bruce Appointed Secretary of Western Society of Engineers

Dr. John T. Rettaliata, president of Illinois Institute of Technology and of the Western Society of Engineers, announces that Fred R. Bruce is the new Western Society secretary. Mr. Bruce has already taken up his duties.

Dr. Rettaliata states that Mr. Bruce has a fine background for his position at the Western Society. Bruce completed his Business Administration course at the University of Minnesota in 1933, then came to Chicago where he worked in the treasurer's office of the Century of Progress. In 1934 and 1935 he worked for Durkee Famous Foods, Inc. For the next 22 years, through 1958, he was employed in the Chicago headquarters office of the Greyhound Corporation as an accountant, statistical analyst, and office manager.

As Greyhound office manager, Bruce supervised the plant restaurant. He also served on committees for many conventions of the National Association of Motor Bus Operators.

Bruce, his wife Edith Nelson Bruce, and their daughter, 17-year old Edith Louise, live at 2740 Woodbine Ave., in suburban Evanston, Ill.

Plans for Kick-off Dinner

The complete calendar of events for the 1959-60 season was shown on page 26 and 27 of the August issue. One of the first important events is the Kick-off Dinner and Open House scheduled for September 14. Plans have already been completed for a very interesting and unusual evening. The festivities will begin at 5:30 P.M. with the Social Hour and inspection of the alterations and refurbishing of the WSE quarters. Then the dinner at 6:30 P.M. will give our members and guests a good opportunity to rate our new food services.

Dr. Rettaliata, president, will officially kick-off the new program season with an outline of some of the plans for WSE that will tie-in with the vision of making Chicago the engineering center of the world.

Then at 8:30 P.M. in the Auditorium, we will be in on the first presentation of "Stereophonic Sound—a New Means of Communication." This program has been especially developed for WSE by Elliott M. Moore, President of Sonic Arts, Inc., and Robert Oakes Jordan, Director of the Laboratories of Robert Oakes Jordan & Associates, Inc.

This program will be of especial interest to engineers and will cover:

1. A general explanation of the nature of stereophonic sound from both a technical and layman's standpoint.
2. A demonstration and explanation of some stereo productions directed to the consumer market.
3. A demonstration and explanation of stereophonic sound in industry.
4. A 16 mm motion picture demonstration with accompanying stereophonic twin magnetic sound track. This is a first in the industry and also developed by the Laboratories of Robert Oakes Jordan & Associates, Inc.

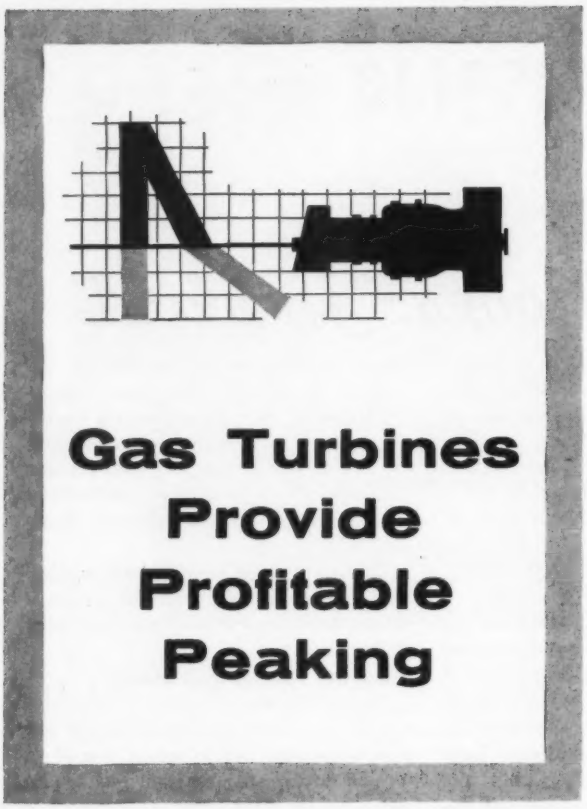
There are some comedy and musical features interspersed with the technical details that result in a very entertaining presentation.

Program Committee Meets

An enthusiastic Program Committee met in an afternoon-evening dinner session at the Bismarck Hotel on August 12 to plan the programming for the current season. The Committee, consisting of representatives from each of the technical sections plus a general representation, was joined by a number of other representatives including Trustees Jackson and Scott, and Chairman Donovan of the Noon Luncheon Committee. The following is a summary of the plans and recommendations of the Program Committee for the coming season:

As previously announced, a series of eight general dinner meetings is planned. The dinner speaker will be followed by two technical sessions. The technical sessions will be reduced to two in order that more emphasis may be placed on obtaining strong programs with the resultant increase in the individual attendance at the technical sessions. The themes of the dinner talks will continue to be of a nature to appeal to all members, with well-known speakers who will cover a broad variety of subjects.

The general sessions will be preceded by the social hour, sponsored by business organizations, as in the past, but will be terminated promptly at an earlier dinner hour so that the meetings may be completed early enough to reduce competition with suburban train schedules.



RAPID PEAK LOAD GROWTH in recent years has focused new interest on costs incurred for providing added peaking capacity. After extensive study, General Electric has concluded that low-investment gas turbines provide the greatest promise of answering electric utility peaking requirements of the future.

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The Program Committee will co-sponsor with one of the technical sections, one luncheon meeting per month and will work together with the Luncheon Committee to obtain nationally known speakers where possible.

The dinner program of the first monthly general meeting on September 29 will be devoted to a cooperative program with the Membership Committee to present to engineers who are prospective members a perspective of Western Society with a discussion of the needs and interests of engineers and how Western Society can best serve them. This meeting is particularly directed to Membership activities associated with the interest in the formation of a West-Suburban group.

The newly formed Education and Research Division, together with the Gas, Fuels and Combustion Engineering Section, will "kick off" the series of technical sessions.

In order to provide wider coverage of the programs in the *Midwest Engineer* for those who are not in attendance, it is planned to work with the Publication Committee to provide transcripts of the speeches for summarization and publication. In certain cases, it is expected that the meetings will be tape recorded in order to obtain a transcript.

In addition to the regular scheduled sessions, it is planned to hold under the auspices of the technical sections and the Program Committee, technical meetings outside the Loop on dates which will not conflict with other WSE activities.

New Luncheon Plan Creates Interest

The new plan of having 3 series of 10 luncheons and selling a book of tickets for each series has created a lot of interest. Even at this early date (August 25) orders

(Continued on Page 18)

Luncheon Committee,
Western Society of Engineers
84 East Randolph Street, Chicago 1

Yes, I would like to support your committee in your plan to assure attendance at WSE luncheons. Here is my check for $_____ to cover _____ books at $15.00* each. It is my understanding that each ticket is transferable for the date shown and may be given to a WSE member or to a non-member.

Name_____
Business
Organization_____
Mail ticket to me
at this address_____
Register Book(s)
for name(s) shown_____

*If you received this notice late and were not able to attend the first one or two luncheons, deduct $1.50 for each luncheon missed. The price will be $13.50 for nine and $12.00 for eight luncheons. Beginning September 30, only individual tickets at $1.75 each will be accepted.

NEW SIGHTS for ENGINEERS

By Dr. James R. Killian, Jr.

This article consists of remarks made on April 13, 1959 by Dr. James R. Killian, Jr., then Special Assistant to the President of the United States for Science and Technology, on the occasion of his presentation of the Washington Award for 1959 at the Dinner of the Western Society of Engineers in Chicago.

In greeting members of the Western Society of Engineers and their guests this evening, I find it appropriate to call attention again to the special role that scientific and technical societies have played in the support and encouragement of science and engineering. With their origins dating back to the sixteenth and seventeenth centuries, scientific societies represent one of the earliest forms of organized and cooperative effort among scientists. Even before science and technology found their way into the curricula of the universities, the societies were fostering and encouraging the efforts of their members to establish the pursuit of knowledge as one of mankind's highest and most idealistic goals, and through the years have helped to preserve it as such.

It is perhaps only coincidental, but happily so, that your meeting tonight falls on the 216th anniversary of the birth of that universal man—Thomas Jefferson.

Jefferson's interests in science and technology were so extensive that one biographer, Edwin T. Martin, has found it possible to produce an entire volume under the general title, *Thomas Jefferson: Scientist.* Jefferson had a keen appreciation of the role of scientific societies and Martin notes that upon being notified that he had been elected to the Royal Institute of Science, Literature, and Fine Arts at Amsterdam,

> Jefferson replied that among the blessings of science was its promotion of a "fraternal relation . . . among the whole family of its votaries, wheresoever dispersed through nations friendly or hostile. . . . These societies are always in peace, however their nations may be at war. Like the republic of letters, they form a great fraternity spreading over the whole earth, and their correspondence is never interrupted by any civilized nation."

Despite the many changes that have developed over the years in the organization of engineering and science generally, the role of the societies has remained essentially the same and their influence has grown and broadened. These societies are the guardians of their professions, with special responsibilities for their welfare and growth and especially for their professional standards and ideals. They also have a responsibility to preserve and advance the close partnership between technology and democracy which Jefferson and the other founding fathers established. It is with respect to that role that I wish to address you this evening.

The engineers indeed have played a proud role in helping to create in the United States a great industrial society, characterized by a sustained eagerness to find better ways of doing things in order that we might continually improve our environment and the health and welfare of all our citizens. So great has been its part in the development of our society and so dynamic are the forces it has generated that the engineering profession now faces new and unprecedented requirements for excellence, for peak

Dr. James R. Killian, Jr., (left) recipient of the Washington Award for 1959, is seen being presented with his plaque by William R. Marston, 1958-59 President of the Western Society. Ormas G. Smith, Washington Award Commission Chairman, looks on.

performance, and for public service. Engineering must change with the changes it produces. Given the record of the past, the objectives of the engineering profession today can be no less than these:

Objectives of the Engineering Profession

To insure that engineering, in the light of today's urgent needs, contributes its maximum to the defense of the United States and the Free World, and to recognize that survival depends upon the vigor, the rigor, and effectiveness of our science and technology.

To employ the arts and science of engineering with zest and audacity to achieve a world in which people everywhere may lead free and abundant lives.

To extend the recognition that engineering is a creative activity that augments man's dignity and understanding and that affords him intellectual adventure of the highest order.

To stress those aspects of engineering which enhance the quality of our society, which encourage individuality in the midst of standardization and which enhance man's excellence and dignity as well as his productivity.

To recognize that outstanding accomplishments in engineering appeal deeply to the hopes and aspirations of men everywhere, and contribute to the prestige and good will of nations.

To recognize and to seek ways of meeting the rising and frequently unmet requirements for excellence in the education, the work, and the professional standards of the engineer.

To work diligently and imaginatively to create a sound and correct public understanding of the work and function of the engineer as a professional man, recognizing that today's image of the engineer lacks sharpness and fidelity.

To break down any barriers which tend to separate the engineers from the scientists, the humanists, and the social scientists.

To use the great opportunities inherent in engineering and science to promote international understanding and good will.

I pause to cite these objectives and ideals because I believe that they are inherent parts of the engineering profession's mission and obligation today and that the profession must set its sights no less high than these lofty objectives. At a time when our society is challenged by persistently hostile forces of great and growing strength, we must seek peak performance and quality in every aspect of our national life, and especially must we set our sights high in the great professions of science and engineering.

The Vaiont Dam across the deep, narrow gorge of the Piave River in Northern Italy will be the highest in the world, when completed in 1960, *Engineering News-Record* reports. The arched concrete structure, only 623 feet wide at the top, will rise 870 feet from the river bed — over 100 feet taller than Mauvoisin Dam in Switzerland and 144 feet higher than Hoover Dam.

Three Aspects

And now against the background of my experience in education and in my present assignment, let me mention three aspects of engineering which seem to me to warrant special attention and elaboration.

First, we need to bring more clearly into focus the image of the engineer in the minds of our citizens. Despite all of the efforts of our engineering societies and councils, this image, as I have noted, is not sharp or accurate. For example, the lack of any clear distinction between the scientist and engineer has been manifest in all the recent public discussions of our national strength in science and technology. Some of the great engineering accomplishments of our time have come to be loosely tagged, in the public mind, under the generic title of science. This confusion is not in the interest either of science or engineering, and the scientists are as unhappy about the confusion as the engineers.

During the past few months there has been much speculation as to why a significant drop occurred this fall in the number of students entering engineering schools. Recently I have been corresponding with engineering educators, in an effort to understand why it happened. Let me summarize the statement of one engineering college administrator who expressed a general reaction: He feels strongly that one of the serious problems in getting qualified young people to go into engineering schools is the great stress today on science, "with the almost total omission of painting the role of the engineer in society for the general public. . . The development of nuclear power, the development of the atomic submarine, the development of satellites . . . are always spoken of as scientific achievements when, of course, they are major engineering feats." Over the long

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run, if we are to "draw into engineering education those students who are eminently fitted and who can make major contributions, we have a major educational job to do . . . This requires a well-conceived and well-executed continuing plan of painting an accurate picture of what the engineer does and the kind of liberal training for a modern technological society which our very best engineering schools provide."

Another engineering dean quite independently made the following comments, "Publicity in recent years regarding science and engineering is confusing to students, their parents, the high school counselors, and the public generally about the work engineers do. Everything novel and exciting is ascribed to 'scientists' while engineers are mentioned in connection with such unpleasant and controversial matters as the location of a freeway. . . . I regard the decline in enrollment in 1958 not as a temporary or chance effect, but as symptomatic of fundamental problems."

I do not advocate any less emphasis on science and its importance. I do urge a comparable emphasis on the role and importance of the engineer. I do not suggest that the two professions should pull apart from each other. On the contrary, each profession will be well served by an ever-closer partnership between the two and by science and engineering speaking with a common voice in our national councils. The concert of work and action, however, can be furthered by a clearer public understanding of what an engineer is and does.

Technological Glamouritis

And here let me interpolate an observation. We are experiencing today in the United States a new problem—technological glamouritis. Certain fields of science achieve a special glamour, and other fields, which may be no less important, become neglected as the glamour fields draw the crowds. This is happening also in engineering. The glamourous fields, such as space technology and some of the futuristic and speculative weapons concepts, tend to overshadow the less spectacular but vitally important technological developments upon which our technological strength also depends, and tend to divert able scientists and engineers from highly important but less glamourous projects. I do not minimize the value of advanced and exciting developments or the great importance of space technology but I do emphasize the importance of carrying through on those developments and activities which, for the moment, are not so far out front in the glamour sweepstakes.

It is unfortunate that within our colleges and universities we have permitted such sharp distinctions to be drawn, first between the sciences and the humanities, and then within the sciences between what is theoretical and what is applied. In life these distinctions do not occur as sharply as we tend to view them academically.

Sir Eric Ashby, President of the Queens University of Belfast, in his new book, *Technology and the Academics*, argues persuasively for the inclusion of technology among the humanistic studies:

> "A case could be made, [says Sir Eric] . . . for including technology among the ingredients of a liberal education. But technology in universities could be made to play for a far more important part than this: it could become the cement between science and humanism. Far from being an unassimilated activity in universities, it could become the agent for assimilating the traditional function of the university into the new age. For technology is inseparable from men and communities. In this respect technology differs from pure science. It is the essence of the scientific method that the human element must be eliminated. Science does not dispense with values but it does eliminate the variability of human response to values. It concerns itself only with phenomena upon which all qualified observers agree. It describes, measures, and classifies in such a way that variation due to human judgment is eliminated. Unlike science, technology concerns the applications of science to the needs of man and society. Therefore technology is inseparable from humanism. The technologist is up to his neck in human problems whether he likes it or not."

I submit that the great engineering

A million and a quarter steel pennies recently were melted in an open-hearth furnace in Pennsylvania, reports *American Machinist*. The coins that made up the $12,500 heat of steel had been withdrawn from circulation by the U.S. Treasury and delivered in sealed metal containers for melting down as scrap.

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societies have a responsibility and opportunity to enhance the significance and prestige of their profession and to help it achieve even greater stature as an intellectual pursuit rather than the mere application of other men's ideas.

A Second Problem

A second and related problem is one of finding ways whereby the engineering profession may bring its great resources to bear in our national policy-making. It is in the national interest that it do this with the same degree of effectiveness that science, law, medicine, and the other great professional groups have found ways of doing. The Engineers Joint Council and the engineering societies have, of course, made great strides in achieving this desirable objective. These efforts need to be fully supported if engineering is to deal effectively with the problems involving the place of the engineer in our society, and if it is to bring to bear effectively the great resources of engineering in our national councils and in the national service.

The Third Need

The third need I would stress is for a major advance in engineering education in the United States. Although our schools of engineering and our institutes of technology present a notable record of achievement and command envy on the part of other nations, and although we have some of the finest schools of engineering in the world, we still face the requirement that these institutions be further strengthened if they are to educate the kinds of engineer which our advancing technology and our industrial society will require.

Once again we have a problem of public understanding. We have been witnessing a great surge of interest in science education; we need an equal concern for engineering education. We have seen in the past few years how effective has been the needed mobilization of public understanding and support on behalf of medical education. We must achieve a comparable national effort on behalf of engineering education, where inadequacy can be as perilous to the national welfare and safety as inadequate medical education.

Within our engineering schools there are many problems to be met, and happily there is a great ferment today in these institutions and a widespread recognition of the opportunities which exist to adapt engineering education to the needs of our advancing technology.

Until now our chief reliance in engineering education has been on undergraduate preparation—a system which has not universally risen above the training of technicians. While there will long continue to be an appropriate and essential place for the really professional four-year undergraduate engineering program, it must be supplemented by expanded graduate study in engineering.

Industries Recognize Need

Many industries have been ahead of many colleges in recognizing this need. As a consequence, they have evolved training programs of their own to carry their engineers beyond the levels of their four-year undergraduate education. If we had the graduate school capacity to handle these men, it would be more appropriate and advantageous for them to receive their advanced training in the university, rather than in industry. The engineer, no less than the scientist, can benefit from an atmosphere of uncommitted research, and our technological advance would be more certain if top graduates of four-year engineering courses proceeded on to graduate study.

The strengthening of graduate study in engineering will serve to enrich the undergraduate program. The research point of view and some research experience can advantageously be made available to able undergraduates.

There is also the well-recognized need to lay greater stress on the engineering sciences. In addition to strengthening the older and long-recognized engineering sciences such as mechanics and thremodynamics, we need to go further and define more clearly those syntheses which are emerging as new engineering sciences, as, for example, solid state technology and communication theory. Still other new subjects are coming into importance, such as magneto hydrodynamics and systems analysis. In order to achieve these new syntheses and develop these new courses, it will be necessary for engineering schools to encourage the development of faculty members with a new orientation in learning and attitude.

New Curricula Tried

Some engineering schools have been experimenting with new curricula which depart from the customary four-year undergraduate program followed by graduate study. Such alternative patterns should be encouraged, especially for more gifted students. The curriculum which permits a continuous program starting with the junior year and carrying a student on to the graduate years without any discontinuity may possess real advantages. With the freshman and

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sophomore years constituting the qualifying period, such continuous programs beginning with the junior year could be of three or four years' duration.

There is a growing opportunity for the delineation of converging fields—the bringing together of engineering with relevant fields of science and social science. The widening concepts of communications provide a good example. The United States needs engineers who have the understanding and the orientation to accept assignments and be effective in foreign service both for industry and for government agencies operating internationally.

In placing as much emphasis on the engineering sciences, I do not mean to imply that we should seek to educate all of our engineers to be research engineers. There is continuing need to recognize in our engineering schools the importance of the "synthesizing engineers" —those "who combine technical training with a broad knowledge of public policy and social problems, who not only design a highway, a waterway, a flood-control project, but who can perceive and allow for the social readjustments—the benefits as well as the cost—of the new enterprise."

In all of these manifold ways we must achieve a deepening and broadening advance in the education of engineers if engineering is to achieve a professional quality and status comparable to that of medicine or law. We shall not have solved our engineering manpower problem until we educate more engineers who unmistakably fulfill our society's standards of true professional excellence; men who have a profound understanding of their specialty, coupled with a broad and human culture. The development and growing numbers of this kind of highly educated engineers will serve to make engineering the profession it must be if it is to attract and hold its proper share of high talent.

Deeper Interrelationships

The enlarged concept of engineering education which I delineate involves even deeper interrelationships between engineering and science and the identification of new areas of symbiotic association between engineering and the humanities and social sciences. We must move toward a new degree of articulation, a fusion of physical technology with social technology, a closer interaction of postdoctoral, graduate, and undergraduate studies, infused with the spirit and example of research at all these educational levels. Through such means our engineering institutions can accelerate the achievement of a program which turns out engineers who can, while achieving mastery of their specialty, avoid the easy, narrow rut of "excessive expertism" and go on to demonstrate, as engineers, leadership in human affairs—the capacity to use and shape technology as a powerful instrument for enhancing the quality of our society and for contributing to the solution of the great human problems of our time.

In the words, again, of Thomas Jefferson, "science never appears so beautiful as when applied to the uses of human life."

The Changing Pattern

Let me conclude with some observations about the changing pattern of relationships between science and engineering on the one hand, and government on the other.

It is not extravagant to say that since 1940 a revolution has occurred both in the use of science by government and the inventions of new means whereby science influences policy. The groundwork, of course, was laid earlier, and we should not overlook the valiant efforts of Karl Compton and the Science Advisory Board he headed in the 1930's. This effort, while frustrating in many respects, did much to make clear the role of science in social progress and in pointing out ways in which the scientific organizations and laboratories of the government could be made more effective. The scientific activities during World War II as organized in the Office of Scientific Research and Development under the direction of Vannevar Bush found new ways to relate the resources of our civilian engineering and scientific community and our private institutions to the needs of government, and the successful use of science in the development of weapons by the OSRD profoundly altered and enhanced the acceptance of science and the use of science for the safety and welfare of the country.

Recall, however, what has happened since the war. The establishment of the Office of Naval Research, even though it was located within a single military service, provided a demonstration of how government, through a system of grants and contracts, could support and advance basic science and scientific and engineering education. Dr. Bush's report, "Science—The Endless Frontier," and the subsequent establishment of the National Science Foundation was another major step. Creation of the Atomic Energy Commission and more recently, the Advanced Research Projects

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Agency in the Department of Defense and the National Aeronautics and Space Administration provide further illustrations of how our government structure can be modified to take care of new needs in science and technology. So, too, were the establishment of the National Institutes of Health, the Institute for Defense Analyses, the Rand Corporation, and the system of weapons laboratories managed for the government by private institutions, both educational and industrial.

Forces Still at Work

The forces which brought about these new institutions and relationships are still at work, and there are many proposals before the Federal Government for the establishment of new kinds of institutions. Some of these are research institutes in specific fields, as, for example, in meteorology, materials research, and oceanography. The government has to deal with such programs as our activities in Antarctica, where there must be a complex mixture of foreign policy and science and exploration. The global and extraterrestrial aspects of many fields of technology, both military and non-military, are requiring new organizational devices. Altogether the thrust of science and technology within government is raising questions profoundly important to the structure of government, to the structure of policy, and to the continuing vigor of American science and engineering.

These forces of thrust illustrate the great importance of an office such as the one that I hold, of the President's Science Advisory Committee, and of the new Federal Council for Science and Technology, which has been created on the recommendation of the Science Advisory Committee. To a degree that was not to be imagined perhaps a half century ago, science and technology are interacting with policy-making, and there must be the best possible means available to make this interaction benign and constructive.

There must also be a constant review of policies and procedures; the relationship of the government with private institutions is one example. The development of a system of grants and contracts for the support of research is a peculiarly American approach to the suport of science. It is characterized by complexities and hazards but it well may be that this system is the best method, given our political framework, whereby science and education can receive federal support and still maintain the essential freedom of private institutions and of science itself.

Requires Vigilance

The system, however, requires constant vigilance and high competence if it is to work well. This is why the structure of our advisory relationships between civilian science and technology and government is of such great importance. This is why there is urgent need for scientists and engineers of high competence to accept assignments in Washington to aid in the management and planning of the government's program. In one respect, present trends are encouraging in that more and more scientists and engineers are being sought to occupy administrative posts of a policy-making kind of government. There is growing recognition that the government's great scientific and technological programs need to be planned and directed by men who know science and engineering.

The great problem now is to find first-rate talent to fill these posts. This is not easy. I have spent much time with heads of departments in Washington trying to help them find competent personnel with scientific and engineering training and I know how difficult the search can be. I know, too, that these assignments are not easy ones. Those who go to Washington must frequently make personal and career sacrifices, but there are offsetting satisfactions. If one will take Washington and politics on their own terms, one can achieve a sense of mission and of accomplishment, and there remains always the overriding fact that the country is dependent upon the willingness of men of high competence to share in managing and planning the nation's scientific and technological program and to bring to bear upon the policy-making and advancement of our country the great resources of these fields. I am confident that we have in our scientific and engineering community in the United States increasing numbers of public spirited men and of scientist-statesmen who are willing to go into the public service in the interest of strengthening American science and engineering and of making them increasingly useful to the safety and welfare of the country.

A Chinese minister of the eleventh century made the wise and witty observation that "A scholar should be the first to become concerned with this world's troubles and the last to rejoice in its happiness." This perceptive comment aptly suggests the social responsibility in the twentieth century of the man of learning and the professional man, particularly the engineer. END.

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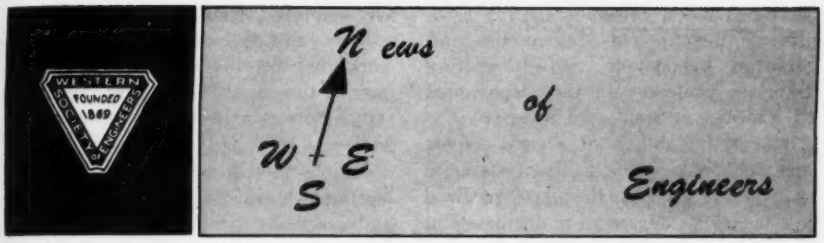

Harold J. McCreary, MWSE, has joined the Ramo-Wooldridge Division of Thompson Ramo Wooldridge Inc.

McCreary has more than thirty-five years of engineering experience. He was formerly senior project engineer at General Telephone Laboratories. He holds more than 145 patents, 51 of these in the United States. Among his many patents is one which is the first in color TV and the first to describe a mosaic structure now used in all television broadcast systems, and a patent on a toaster-timer now used on Toastmaster of McGraw Electric Co.

He is the author of various articles which have appeared in radio and electronic journals. During World War II he taught communications engineering at Illinois Institute of Technology and served as project engineer with Admiral Radio in getting their FM Radio Two-way Communicator into production.

McCreary is a Fellow of the American Institute of Electrical Engineers, and member of the electronic committee of the National A.I.E.E.; a Senior member of the Institute of Radio Engineers, and a Professional member of Eta Kappa Nu, honorary society in addition to being a member of the Western Society of Engineers. He has been a leader in these organizations in the Chicago area, heading numerous committees and sections. He was formerly a director of the National Electronics Conference, Inc., representing the Chicago section of A.I.E.E. in 1950, 1951, and 1952, and was Secretary of N.E.C. in 1951.

McCreary is a native of Scottsbluff, Neb. He received the B.Sc.E.E. degree from the University of Nebraska in 1923, taking graduate courses at Hawthorne Evening School and the University of Chicago. In 1950 he was awarded a Professional E.E. degree by the University of Nebraska.

McCreary and his wife, Vera, will make their home in Canoga Park when the corporation moves there in November.

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Paul J. Meeks, president of the Clary Dynamics Division of Clary Corporation, has announced in San Gabriel, Calif., the appointment of Frank J. Grigware as general manager in charge of plant operations.

Grigware has been with Clary seven years. His most recent position was assistant to the plant manager.

He attended I.I.T.

(Continued on Page 12)

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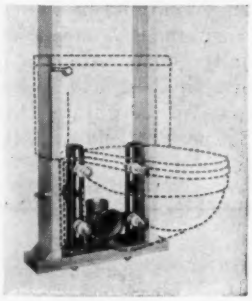

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Bernard C. Berry, Chairman of the Board of Directors of The Allen-Sherman-Hoff Company, a division of A-S-H Industries, Inc., has retired from active management duties. He will, however, continue to be affiliated with the firm in a consulting capacity.

Mr. Berry's association with the company, leading engineers and builders of bulk materials handling systems used throughout the world, goes back over 30 years. Beginning as manager of production service, and erection in 1929, he became manager of the firm's New York office and later, general sales manager. In 1950, he was elected President of the company and Chairman of the Board of Directors in 1955.

Mr. Berry is widely recognized as a specialist and authority in the power and allied industries. He entered this field after graduating from the School of Science and Technology of Pratt Institute, first with Combustion Engineering, Inc., then with Sanderson & Porter, and later with The Allen-Sherman-Hoff Company.

A Life Member of the American Society of Mechanical Engineers, Mr. Berry is also an active member of the American Institute of Mining, Metallurgical & Petroleum Engineers, Inc., the Engineers' Club of Philadelphia, and the Engineers' Club of New York.

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Colonel **Alfred W. Sikes,** MWSE, was presented with a medallion denoting his election as a Fellow of the Construction Specifications Institute at the national convention of the Institute held in Chicago, May 4 thru 6, 1959.

Colonel Sikes was founder and first president of the Chicago Chapter, C.S.I., and won the award for actively furthering the ideals of the Institute and for pioneering and directing the first series of educational evening seminars in the construction specifications field. He is currently a specification engineer with the Chicago Park District.

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Dr. George J. Resnikoff became director of the department of industrial engineering at Illinois Institute of Technology, Chicago, effective September 1.

Resnikoff previously served as acting director of the department.

He became a member of the Illinois Tech staff in 1957 and previously had served as a lecturer and research associate in the Applied Mathematics and Statistics Laboratory, and as visiting associate professor in the Department of Statistics at Stanford University.

He is the author of several papers and one book in the fields of statistics and quality control. Resnikoff received his bachelor's degree in mathematics at the University of Chicago and his master's degree and Ph.D. in mathematical statistics at Stanford University.

•

The Trustees and Faculty of Purdue University, Lafayette, Indiana have conferred the degree of Doctor of Engineering honoris causa at the commencement exercises held at the University on Sunday, May 31st on Mr. Vincent P. Reilly of River Forest, Illinois. This conferral, as stated by the University, gives recognition to outstanding professional achievement and a distinguished record of service. Mr. Reilly is the founder and president of the Illinois Gear & Machine Company of Chicago. He was graduated from the University in Mechanical Engineering in 1922.

V. P. Reilly

•

Roy Blair Everson, president of the Everson Manufacturing Corp., Chicago, was recently feted by many employees and friends upon his sixty-fifth year in the water treatment business and the celebration of his distinguished eightieth birthday! He was born in Bradford, Pa., July 12, 1879, a decendant of Cornelius Ever"t"son, Dutch Admiral who captured New York. The family settled in Cattauragus County, New York, as did the Rockefeller family, part of the family settling in New Jersey; others moving to the Pennsylvania Valley.

Mr. Everson has improved the water treatment business since 1900, inventing and patenting nearly 150 devices that have perfected his chlorine machine, the Everson Sterelator, 5,000 of which he has installed everywhere in the United States and as distantly as Okinawa Island, Mexico, Canada and Japan.

In 1913, he installed the first chemical machine used in a swimming pool, which at once popularized swimming pools, since no longer did swimming pool water have to be changed daily; this same pool water, tested daily, during a three year period proved as pure as the city drinking water. A peaceful use of chlorine gas had been innovated by Everson!

In 1903, he gave the first Home Show Exhibit of Water Filtering equipment for home and industrial use in laundries, at the Chicago Coliseum.

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Dr. Morton Hamermesh has been appointed Director of the Physics Division at the Argonne National Laboratory.

Dr. Hamermesh succeeds as head of the Physics Division Dr. Louis A. Turner, who recently became Argonne's Deputy Director.

Dr. Hamermesh, 43, is an 11-year veteran of the government's atomic energy program. He joined Argonne in 1948 as a senior physicist, and became Associate Director of the Physics Division in 1951, a post he held until the present promotion.

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His major work has been in the general area of theoretical physics. He has, in particular, made noteworthy contributions to the field of neutron polarization and scattering.

An expert on scientific Russian, Dr. Hamermesh has translated a volume on classical theory of fields from that language. He serves on the American Institute of Physics Advisory Committee on Russian Translations.

He recently returned to Argonne from a nine month research period in Zurich, Switzerland, where he worked on his forthcoming book which concerns certain mathematical theories and their relationships to basic research problems in physics. The title of the volume is *Group Theory as Applied to Quantum-Mechanical Problems.*

He received a bachelor of science degree in physics in 1936 from the City College of New York, and spent the next several years as a junior instructor at CCNY, while doing graduate work at New York University and research at Columbia University.

In 1940, he was granted a Ph.D. degree in physics from New York University.

Dr. Hamermesh is a fellow of the American Physical Society, and a member of the Argonne chapter of the Scientific Research Society of America (RESA), a national honorary scientific society.

He has contributed to a number of learned journals, including the Physical Review, the Journal of Applied Physics, and Nuovo Cimento, an Italian journal of physics.

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Dr. T. Paul Torda has been named director of propulsion and fluids research at Armour Research Foundation of Illinois Institute of Technology, Chicago.

Most recently Torda was professor of mechanical engineering at the Polytechnic Institute of Brooklyn, New York. Prior to that, 1949-1955, he was a professor in the department of aeronautical engineering at the University of Illinois.

He has served as a consultant to many companies in rocket propulsion and is an authority in the fields of liquid and solid propellant rockets, boundary layer control, turbo machines and viscosity effects in fluid mechanics.

In his new position Torda will direct areas of research and development in hydrodynamics, thermodynamics and fluid mechanics, propulsion, combustion and explosives, and weapons and missiles.

A native of Hungary, Torda received his master's degree at the Technical University in Berlin-Charlottenburg. He earned his doctorate at the Polytechnic Institute of Brooklyn.

His affiliations include the American Rocket Society, American Society of Mechanical Engineers, Sigma Xi, Sigma Gamma Tau, an honorary aeronautical fraternity and Pi Tau Sigma, an honorary mechanical engineering fraternity. Torda is an associate fellow of the Institute of Aeronautical Sciences and a member of the American Association for the Advancement of Science.

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B. C. Biega, formerly a supervisory engineer at General Electric Company in Fort Wayne, Indiana, has been named assistant sales manager of Precision Transformer Corporation of Chicago, announced Melvin S. Adler, president.

He will be in charge of Precision's specialty sales organization, servicing industrial and equipment accounts with custom-built transformers for special installations.

The Polish-born engineer, a graduate of Technical University of Warsaw, was chief electrical engineer for Equipment and Engineering Company Ltd. of London, England, for four years prior to coming to the U.S. He served in the Polish Underground during the war years and was in the Warsaw Uprising of 1944. He was a design engineer with Square D Company in Detroit before joining General Electric, where he was in charge of design of large dry type and specialty transformers. His work at GE included complete installation of district sub-stations, rectifier transformers, power centers for mines, industrial process controls involving transformers and saturable reactors.

Biega is a member of the American Institute of Electrical Engineers subcommittee on electrical installations in industrial buildings. He has had several papers published by the AIEE.

"Our new specialty division will provide a distinct service to equipment and switchboard manufacturers," said Biega.

•

Alex F. Feiereisel, vice president in charge of engineering for SpeedWay Manufacturing Company, a division of Thor Power Tool Company, LaGrange Park, Ill., retired August 1 after more than 41 years with the power tool manufacturing company.

Feiereisel joined SpeedWay as a grinder operator on Dec. 27, 1917. He was promoted to foreman of the grinding department in 1920, then successively became foreman, assistant plant superintendent, plant superintendent, chief engineer, and vice president in July, 1957.

On Feiereisel's last day of work, SpeedWay's President W. B. Scace and Executive Vice President J. R. DeBacher presented him with a golden hour clock in recognition of his many years of service.

Born Nov. 30, 1892, in Chicago, Feiereisel attended Chicago schools and started his industrial career with International Harvester Company in 1912 as a patternmaker. He then spent two years with Stewart Warner before joining SpeedWay.

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Reviews of Technical Books

Legal Aspects

Legal Aspects of Construction, by Walter C. Sadler, Engineering and Legal Consultant, McGraw-Hill Book Co., Inc., 330 West 42nd Street, New York 36, N.Y., 387 pages, $8.50.

Legal Aspects of Construction is a practical and thorough guide to help avoid legal conflicts in the construction industry. It states the rights and liabilities of contractor, designer, owner, and financier. Suggestions are made for avoiding misunderstanding and disagreements.

Summaries of court cases are included which involve the liabilities of owners, architects, engineers, and contractors, and deal with such factors as errors in design, overlooked construction details, carelessness, negligence, etc.

Subjects emphasized are licensing in contractors, mechanics liens, insurance, labor and management, the union, contract, workmen's compensation, accidents, arbitration, architectural practice, the owner's responsibilities, professional registration, rights at the boundary, lateral support, foundations, statutes and ordinances, and injunction and mandamus.

Legal Aspects of Construction is a book containing valuable information.

Structures

The Structures of Edwardo Torroja, by Edwardo Torroja, Dodge Books, F. W. Dodge Corporation, 119 West 40th Street, New York 18, New York, 208 pages, $8.50.

The Structures of Edwardo Torroja is an autobiography of engineering accomplishment. Edwardo Torroja, famous Spanish architect-designer, has written the book which illustrates, describes and explains the major accomplishments of his career. He has chosen 30 of his works for description.

The 30 structures include bridges, viaducts, dams, hangars, sports arenas, factories, and churches. Many are of reinforced concrete.

Mr. Torroja created and directs the Technical Institute of Construction and Cement at Costillares in Spain.

The book shows the author's reasoning in arriving at the design of each structure, and reveals his unusual building philosophy. Two hundred and seventy-five photographs are included.

Chemical Process Economics

Chemical Process Economics, by John Happel, John Wiley & Sons, Inc., New York 16, N.Y. Pages, 291. Price, $8.50.

This book was written to assist the application of technical information to economic design and operation of chemical-process plants.

Uniform in its treatment, the book covers principles of economic balance, practical information, and applications. Problems concerning the selection of new equipment, design of process plant components, and operation of existing plants under optimum conditions are all handled by means of the same basic relationships which, in turn, are given a careful mathematical development. Dr. Happel emphasizes the quantitative viewpoint and links this to the qualitative considerations involved in management and the general social implications of engineering economy.

Chapter headings consist of: principles of economic balance; expanded economic balance equations; special mathematical techniques; notes on cost estimation; risk, return rate, and investment recovery; over-all considerations in project analysis; process plant components; and social values in engineering economy.

Among the individual points included here are judging new enterprises, the estimation of equipment costs, minimum acceptable return rates, and the economics of unit operations. In addition, a special appendix is devoted to "rules of thumb" for the practical design of chemical plants, based on the experience of many engineering firms.

The author, John Happel, is professor and chairman of the Department of Chemical Engineering at New York University. A licensed professional engineer, Dr. Happel's non-academic experience includes 17 years in the petroleum industry. He was jointly responsible for the design of the world's largest butadiene plant, and is a specialist on process economics and economic calculations.

The Building of TVA

The Building of TVA, by John H. Kyle, Louisiana State University Press, Baton Rouge 3, La., 162 pages, $7.50.

The Building of TVA is an illustrated history of the 41,000 square mile Tennessee River Basin project. The book traces the design and construction of the physical plant, dams, buildings, bridges and steam plants. Many excellent photographs are included.

The project was initiated in the midst of the depression to tame the river and to provide needed employment.

The Norris Dam, started in 1933, is considered an unusual showpiece. The author describes Fort Loudoun, Watts Bar, Chickamauga, Hales Bar, Guntersville, Wheeler, Wilson, Pickwick Landing, and Kentucky Dams. The book also describes the roads, bridges, and office buildings.

J. H. Foote Elected AIEE President

J. H. Foote of Jackson, Mich. has been elected as 1959-60 President of the American Institute of Electrical Engineers. Mr. Foote is chief engineer of Commonwealth Associates and has been active in national and Michigan affairs of AIEE for many years. He also is vice president and director of engineering for Commonwealth Services Inc. at Jackson.

The announcement was made by a Tellers Committee which tallied a mail ballot by the Institute's more than 52,000 members. The Committee also announced the election of the following vice presidents:

Vice Presidents Elected

Donald L. Greene assistant chief electrical engineer, Gilbert Associates, Reading, Pa.; John W. Davis, outside plant manager, Southern Bell Telephone and Telegraph Co., Atlanta, Ga.; Max H. Kight, Chief, Electrical Branch, U.S. Bureau of Reclamation, Denver Federal Center, Denver, Colo.; George T. Harness, associate dean of electrical engineering and professor of electrical engineering, University of Southern California, Los Angeles; Dr. Rene Dupuis, commissioner, Quebec Hydro Electric Commission, Montreal, Quebec and Frederic S. Bacon, general sales manager, Gamewell Co., Upper Newton Falls, Mass.

Directors Named

Directors named were: Hendley N. Blackmon, Westinghouse Electric Corp., Pittsburgh; Estill I. Green, Bell Telephone Laboratories, Inc., Murray Hill N.J.; Sven M. Osthagen, Allis Chalmers Mfg. Co., Providence, R.I. C. H. Linder, General Electric Co., New York, was re-elected treasurer.

Mr. Foote, a member of the Institute since 1918, completed a term as vice president in 1958. He has been a member of many AIEE technical and administrative committees and chairman of several. He is a graduate of the Michigan State University and received an honorary degree of Doctor of Science in Engineering from Wayne State University.

Mr. Foote is a member of the Engineering Society of Detroit and has served as a president of the Michigan Engineering Society, chairman of the Michigan Board of Registration and director of the Michigan Society of Professional Engineers. He is a director of the American Standards Association, a Fellow of AIEE and of the American Association for the Advancement of Science.

Walker L. Cisler to Head ASME

Walker Lee Cisler, president of the Detroit Edison Company, has been named to lead the 50,000-member American Society of Mechanical Engineers, one of the nation's leading professional organizations. Mr. Cisler heads a slate of four vice presidents and three directors chosen by the Society's nominating committee in June. Mr. Cisler was honored with the Washington Award in 1957.

The new officers will be installed in December, during the Society's Annual Meeting, in Atlantic City, following a mail ballot of ASME members.

Other Nominees

The other nominees are Charles H. Coogan, professor and head of the mechanical engineering department, University of Connecticut; William C. Heath, director of market development, Solar Aircraft Company, La Mesa, California; Donald E. Marlowe, dean of the school of engineering and architecture, Catholic University of America, Washington, D.C.; and Henry N. Muller, Jr., vice president of Canadian Westinghouse Company, Ltd., Hamilton, Ontario, vice presidents and: Everett M. Barber, research supervisor, Texaco Research Center, Beacon, New York; Clarence C. Franck, consulting engineer, steam division, Westinghouse Electric Corporation, Philadelphia, Pa.; and William H. Larkin, New England manager for the Air Preheater Corporation, New York, directors.

Mr. Cisler, who is also a director of the Detroit Edison Company, has been closely associated with power industry developments during his career. He has been actively engaged in furthering the growth of atomic energy as a power source and served as executive secretary of the Atomic Energy Commission Industrial Advisory Group and president of Atomic Power Development Associates, Inc., Fund for Peaceful Atomic Development, Inc., and the Power Reactor Development Company.

His services to the government have been uninterrupted since World War II, and he is presently the U.S. member of the Energy Advisory Commission of the Organization for European Economic Cooperation.

A fellow of ASME and a member of many professional and civic groups, he holds a mechanical engineering degree from Cornell University. Mr. Cisler also holds honorary degrees from the University of Michigan, the University of Detroit and Wayne State University.

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Tiny screws have been providing king-sized headaches for space engineers and scientists. Thinner than a fine needle, they are vital components of the delicate instruments and controls in missiles and rockets.

Until recently, there were no standard screw sizes at those Lilliputian dimensions, and engineers had to design their own screws for every new instrument.

Now, a solution has been reached. A publication called "American Standard Unified Miniature Screw Threads, Bl.10-1958," has been approved by the American Standards Association and published by The American Society of Mechanical Engineers. It establishes a new thread series that will go a long way towards simplifying design of space-age instruments, as well as watches and other more down-to-earth miniature mechanisms.

New Publication

The new publication establishes fourteen standard screw thread sizes, with a standard design that covers all of them.

Screws covered by this standard are so tiny that 75,000 of the smallest of them would fit in a thimble. The threads on these are invisible to the naked eye. The diameters of the screws range from one-hundredth (0.01) inch—about three times the diameter of a human hair—to six one-hundredths (0.06) of an inch.

As long as most of these tiny fasteners were used in watches and other "non-critical" applications, it didn't make too much difference whether there were standard dimensions or not. Interchangeability was unimportant, except sometimes to the customer who had to wait for weeks to have his watch repaired. But things have changed.

For one thing our armed services are faced with the problem of maintaining a supply of spare parts for their missiles, and that would mean keeping a stock of thousands of different screws, each a little different from each of the others.

For another thing it is a waste of scarce engineering talent to produce thousands of different sizes of screws when a few hundred might do as well. In time, with the new standard, it will be possible to limit production and inventory to several lengths of screw in each standard diameter.

The new miniature series will allow interchangeability with screws made in many other countries, too. The new series is substantially in agreement with the recently approved Recommendation

Some of these tiny screws can be hidden on the dot of a typewritten "i." A new American Standard will insure interchangeability among these screws, reducing design and supply headaches.

68 of the International Organization for Standardization (ISO), and with agreements endorsed by the American-British-Canadian Conference on the Unification of Engineering Standards of 1955.

With the establishment of the new series, interchangeability of screws made to any of these standards is assured. In addition, the thread profile established by the new series conforms to that of the Unified and ISO basic profiles for regular screws.

The new standard was drawn up by subcommittee No. 4 on instrument screw threads of ASA's sectional committee on screw threads, B1, sponsored by The American Society of Mechanical Engineers and the Society of Automotive Engineers.

The series covers a diameter range from 0.30 to 1.40 millimeters, or 0.0118 to 0.0551 inch. It supplements the Unified and American Series, which begins at 0.060 inch, number 0 of the machine screw series.

There are 14 sizes distributed systematically through this range, providing a uniformly proportioned selection. A 60 degree thread angle, and a coefficient of 0.52 for thread height, were adopted over the entire range. This coefficient differs from that of the ISO Recommendation, which is established at 0.54127, but the difference is expected to have no practical effect on interchangeability of screws made to either standard. The 0.52 figure is based on practical manufacturing considerations and on a plan evolved to simplify calculations and achieve more precise agreement between metric and inch dimensional tables.

The new standard also establishes tolerances; NSO Recommendation 68 does not.

Work on miniature screw thread standards dates back to the early 20's, when the Swiss established standard NHS 56100. Little was done in this country until World War II, when the war effort pointed up the need for both a national and an international standard. A committee was set up to study the problem; at the end of the war it continued its work and became subcommittee 4.

American Standard Unified Screw Threads, Bl.10-1958, is available from the American Standards Association or from The American Society of Mechanical Engineers. END.

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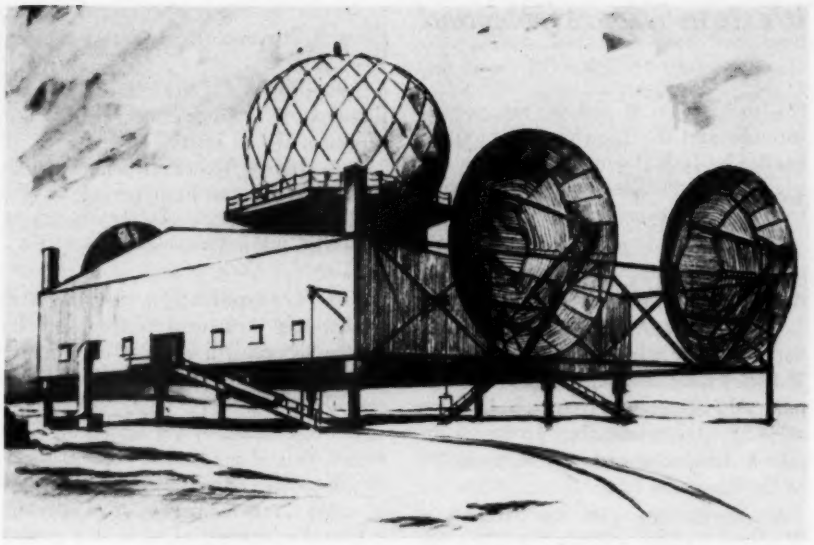
On the Level

GIANT jack screws, each 14 feet high and 5 inches in diameter, are a key part of the unique means of lifting and leveling the huge five-story radar buildings and radomes of the two new Distant Early Warning (DEW) Line stations built on the Greenland icecap during the summer of 1959.

A total of 64 of the long threaded columns with mating lifting nuts and jam nuts for this purpose has been produced and shipped by Standard Pressed Steel Co., Jenkintown, Pa., on order from Perfecting Service Co., Charlotte, N.C., designers and manufacturers of the lifting and leveling system.



Giant jack screws 14 feet high manufactured by Standard Pressed Steel Co., Jenkintown, Pa., are a key part of the unique system for lifting and leveling this five-story radar building and radome—one of two new Distant Early Warning (DEW) Line stations built on the Greenland icecap during the summer of 1959. The jack screws, each tested to withstand a load of 1,600,000 pounds, are used 32 to a station to level the structure on the shifting icecap and to lift it above the snowline to maintain a constant clearance.

32 to a Station

The novel mechanical leveling system will be called into play whenever the mammoth radar facilities tilt out of level. The jack screws—32 of them to a DEW Line station—together with related hydraulic and electric systems will compensate for the shifting footing afforded by the frozen icecap with changes of temperature. The stilt-like supports will also raise and lower the five-story buildings to maintain a 15-foot clearance with the ground, despite varying accumulations of snow.

Each jack screw, longest part ever threaded by precision fastener maker SPS, can sustain a load of more than 800 tons. The 32 jack screws at each station will support a five-story building atop of which will be a radome-enclosed 60-foot diameter radar antenna.

The two installations are the so-called Icecap stations of the DEW Line being built by Peter Kiewit Sons' Company of New York City for the Army's Corps of Engineers, Eastern Ocean District. The radar is part of the military's aircraft early warning set-up.

Race with Time

In an interesting race with time, the ticklish job of producing the 14-foot members was handled by SPS in 4 weeks. A missed delivery date of even a few days, due to any sort of delay or rejects, might conceivably have set the entire DEW Line project back a whole year. There is only a certain period in the summer during which the installation can be completed.

Installation was scheduled to be made in one day, according to Harman Shaw, vice president of Perfecting Service Co., though he hastened to point out that this day in the Arctic lasted for about 4 months.

The long jack screws were anchored in footings surrounding the circumference of the radar site. The framework of the five-story building were connected to the 32 lifting nuts that run up and down the threaded portions of the jack screws. At the push of a button, the system will automatically level the building whenever things get out of kilter.

The 1000-pound jack screws were each tensile tested to withstand a straight pull of 1,600,000 pounds.

Tests were conducted in the huge 5,000,000-pound Baldwin testing machine of the Aeronautical Structures Laboratory, Philadelphia Navy Yard.

The studs were machined by SPS out of heat-treated ASTM grade (4340-type) alloy steel bar. Lift nuts were made from bronze-aluminum-manganese castings. Some of the studs were precision threaded for as much as seven consecutive feet. Fabrication was handled on large, special-purpose machine tools of SPS Nuclear Components Div.

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Western Moves Forward

(Continued from Page 4)

for the books of tickets are coming through and the Luncheon Committee, headed by Jack Donovan, Chairman, has high hopes that this system will help solve the luncheon attendance problem.

Here are some preliminary plans for the first series that are being studied by the Luncheon Committee—

Dr. Barthels, Armour Research Foundation, "New Horizons in Research." This luncheon will be sponsored by the new Education and Research Division of WSE. An outstanding group of Research Administrators will be presented at the Speakers' table.

Under the new plan the Sections of Western Society will play a more important part in the development of outstanding luncheon programs and the luncheon of September 23 will be under the guidance of the Electrical Section. John R. Conrad, President, S & C Electric Co., is a possible speaker for that luncheon. For subsequent luncheons:

Wesley I. Nunn of the Advertising Council, "Psychological Warfare Against Recession"

James Pisco, Chief Engineer, Chicago Regional Port District, "Chicago's Future as a World Port"

S. L. Jewell, Vice President, Peabody Coal Co., "Human Engineering"

Robert Galvin, President, Motorola, "America's Future Depends on the Engineer"

The Transportation Section, the Bridge and Structural Section, and the Traffic Section will assist in the development of luncheon programs for the first series.

It is the belief of the Luncheon Committee that if a member will regularly attend the luncheon programs, regardless of subject, that the net result will provide a liberal education of at least a conversational character.

If you have not already ordered your book, or books of tickets, the accompanying coupon will make it easy to do so. Note that if you miss the first one or two luncheons, the ticket price will be pro-rated. (Coupon is on page 4.)

Young Engineers Forum Begins October 5

This year the Young Engineers Forum has been moved up from the usual mid-November starting date. According to Richard N. Bergstrom of the Commonwealth Edison Co., who is Chairman of the committee, it was felt that the schedule of October 5 and 19, November 2 and 16 and December 7 conflicted less with both the Thanksgiving and Christmas Holidays and that the sessions would be spread out a little more over the Fall season.

This Young Engineers Forum has had very fine support from Chicago industry and as a result nearly 300 young engineers are selected by their companies to attend this series of dinner programs.

The host at each table is an engineer of some eminence in the field, and the young engineers participate in an organized discussion at each table and prepare questions which are passed on to the Forum speaker.

Plans are already well formulated for the 10th Young Engineers Forum of WSE.

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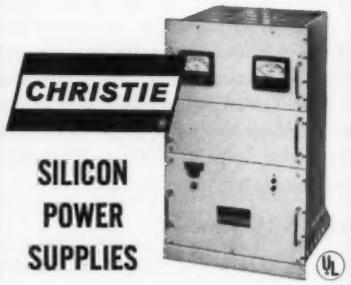

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New Products

As described by their Manufacturers

Battery Tester

Christie Electric Corp. announces the development of a new Automatic Battery Tester & Charger, Type BC24-25T, for 24 volt aircraft batteries of the lead-acid or nickel cadmium types.

This unit features a unique programmed test-charge sequence which performs the necessary functions designed to eliminate the possibility of installing defective batteries in aircraft. The entire program is automatic, eliminating the need for trained or skilled operators.

Precision charging is offered irrespective of variations in a-c line within range, battery initial state of charge or temperature. Voltage regulation is accomplished through magnetic amplifier control, utilizing no tubes or transistors. The BC24-25T is built to meet military standards.

For further information write Christie Electric Corp., 3410 W. 67th Street, Los Angeles 43, California.

Four-way Valve

A new Model "A" ¼-inch four-way valve has been added to its valve line by Alkon Products Corporation, Hawthorne, N. J., manufacturers of pneumatic and hydraulic valves and cylinders.

Sub-base mounted, valves in the Model "A" series are rated at 200 psi or vacuum air service, and are said to incorporate many features as standard that are normally available only at extra cost.

The valve body and spool have the same unique packless features developed by Alkon for its other series and proved in many applications. Precision tolerances of .000050" (50 millionths) provides for valve assemblies with consistent sealing characteristics, overcoming the problems inherent with packing-type valves. Special surface treatment in the final stages of manufacture provides all working surfaces with a hardness equivalent to that of tungsten carbide. This surface hardness, the manufacturer maintains, preserves indefinitely the sealing surfaces.

To meet the requirements of machine tool builders, sub-base mounting has been designed as a standard feature in the entire Model "A" series at no extra cost. Single solenoid valves in the series, for example, list for $34.50.

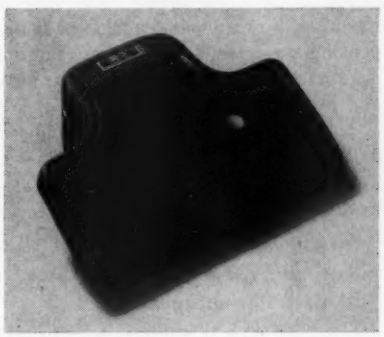
All ports are unrestricted full pipe area passages, resulting in a high flow capacity.

Model "A" valves are available with a variety of actuations, and the designer has the option of hand, foot, pilot, cam, solenoid or bleeder-type actuation to satisfy any circuit requirement.

For further information, write Alkon Products Corporation, 200 Central Avenue, Hawthorne, N. J.

Footswitch

Several new versions of the popular Clipper Footswitch, all featuring wide treadles for convenient, foolproof operation, have been announced by Linemaster Switch Corp., 432 Woodstock Terrace, Woodstock, Conn.



Mechanically, the new Clipper incorporates all the rugged features which have made Linemaster switches famous for heavy duty industrial uses. It is available in both momentary and maintained contact types, with single pole, double throw or double pole, double throw circuits. Two mounting holes are provided if rigid mounting of footswitch is desired.

The new Clipper Switch has the same high electrical ratings and unique molded nylon actuator that have proved to be popular features of the line. A catalog sheet on the new Clipper Switch is available from the manufacturer.

Activated Rosin Flux

A new, activated rosin flux that leaves an unusually resistive residue after heating—features of prime importance in circuitry soldering—has just been introduced by Alpha Metals, Inc., producers of high purity metals, solders, solder preforms and a full line of flux and soldering chemicals.

The name of this flux is ALPHA 610. In its raw state it has relatively low conductivity. During soldering, the rosin's conductive constituents are destroyed; the flux residue becomes highly resistive.

Among the other advantages of ALPHA 610 Flux are its qualities of instant wetting, excellent capillary action and a moderate drying rate.

Because of its performance, ALPHA 610 is specially valuable in printed wiring applications, such as those found in the production of computers, and other critical circuitry work.

ALPHA 610 Flux is available in 1 gallon, 5 gallon and 54 gallon units.

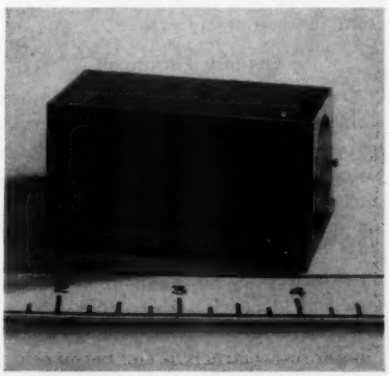
For technical information on new ALPHA 610 Flux, write to Alpha Metals, Inc., 56 Water St., Jersey City 4, N. J.

Inertia Switch

Sensitive to accelerations ranging from 0.05 g to 1.0 g, Inertia Switch Model 60U-01 has been announced for missile and airborne applications. The new switch, with normally open contacts, offers precise uni-directional control for very low g applications. Its response time is less than 35 millisecs, with accuracy within 10%.

A patented Inertia design is responsible for the accuracy and dependability of Model 60U-01. A precision-ground ball is held by an alnico magnet. When acceleration exceeds the magnetic force, the ball moves to make electrical contact.

The 60U-01 is factory pre-set, with nominal setting specified by the user. It can be made adjustable by the user



if desired. Service life is over 100,000 cycles. Meets MIL E-5272A or better.

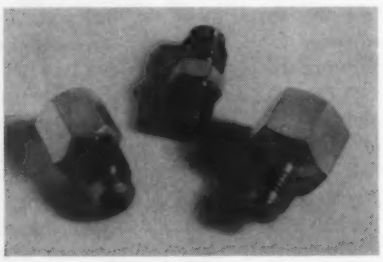
Prices and technical data are available from Inertia Switch, Inc., 311 West 43rd Street, New York 36, N. Y.

Pressure Snubber

A compact, inexpensive pressure snubber, especially designed for refrigeration and air conditioning applications, has been announced by the Chemiquip Company, 36 East 10th Street, New York. The snubber protects pressure-sensitive instruments against line-induced pulsations or surges. It also helps protect refrigeration systems against leakage, since the snubber design eliminates a joint in connecting threaded devices to tubing.

The new Chemiquip snubber element is a ¼" disc, containing many fine pores, fabricated from Type 316 stainless steel to guard it against corrosion by free acids. This porous membrane reacts to changes in pressure in much the same way as a restriction orifice. The relatively large surface area prevents clogging, and the porous membrane is specially treated so that suspended oil in freon-type refrigerants will not hamper the efficiency of the snubber.

Housing in brass or steel is available in a variety of sizes: ⅛" npt or ¼"



npt, male or female, by ⅛", ¼", 5/16", or ⅜" tubing, flared or compression.

Technical data, prices, etc., available from the manufacturer.

See-thru Packaging

See-thru vinyl packaging on their stainless steel fastenings is a new service being extended by Star Stainless Screw Company. Known for their quick service on more than 7,000 sizes and types of stainless steel fastenings "right off the shelf," the new vinyl packaging will aid quick selection, keep fastenings free of dust and grime.

Packages are sized to standard lots, tubular in construction and permanently

sealed at one end. The other end is closed in such a way that it may be opened and re-opened for convenience in use. This vinyl casing forms a pliable, tough package which should prove very helpful to manufacturers, not only in checking shipments and stock, but in dispensing these fastenings for use in various quarters, keeping work stations neat, and preventing small losses.

The new see-thru vinyl packaging will be used on all the stainless steel fastenings listed in the new Star Catalog available from Star Stainless Screw Company, 699 Union Blvd., Paterson 2, New Jersey.

Slow-speed Motors

Shielded by a heatproof, splash proof and shatterproof housing, a new "F" series of slow-speed motors has been announced by Brevel Products Corporation. These new "mighty-mite" power units are designed for use with rotisseries and other applications where resistance to heat and splashing grease is important.

This low cost, fractional horsepower motor is just one of the many spur gear, worm gear and other types of motors made by Brevel, who specialize in slow speed motion. These motors are ideal for powering small electrical appliances, motion displays, vending machines, and other electrical devices for home and industry.

Rigid pre-testing, factory run-in, precision production techniques and skilled design assure long motor life and trouble-free operation from every Brevel motor. Brevel engineers are available to work with designers on specific installation problems.

A new technical bulletin on the fully enclosed Series "F" motors is now available from Brevel Products Corporation, 601 W. 26th St., New York 1.

Pilot Safety Switch

What happens in any gas-fired industrial heating operation, when for any reason the pilot flame becomes extinguished?

Nothing happens, according to the Partlow Corporation, New Hartford, New York—if the operation is protected with Partlow's new Model SBS Safety Switch.

That is, nothing of a disastrous nature. In the event of pilot flame failure, the Partlow switch goes into action automatically and shuts down both pilot and main fuel flow by actuating a solonoid valve.

All fuel will be shut off in 30 to 45 seconds, the Partlow company said.

The SBS Safety Switch is simple and positive in operation. Under normal operating conditions, a mercury-filled bulb,

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installed close to the pilot flame, is heated to a bright red.

The switch remains in a depressed position, allowing the uninterrupted flow of fuel. An indicating dial shows that normal operation is proceeding.

If, for any reason, the pilot flame is extinguished, the mercury vapor in the bulb condenses. This condensation interrupts the circuit to the solonoid valve or other devices. At the same time, an indicating needle will drop, showing that the pilot flame is out.

The Model SBS may be mounted in any convenient location and in any position, as long as the instrument body is not subjected to abnormally high temperatures.

Proper operating temperature for the bulb is between 1200 and 1400 degrees F. In installing, the bulb is positioned so that the welded portion does not come in contact with the flame. Partlow recommends that Model SBS be used with the Partlow Model 270-A Pilot Burner. This burner features a built-in holder for the bulb which positions it properly in relation to pilot flame.

Complete information on the SBS Safety Switch may be obtained by writing for Bulletin 761 to the Partlow Corporation, 517 Campion Road, New Hartford, New York.

Literature

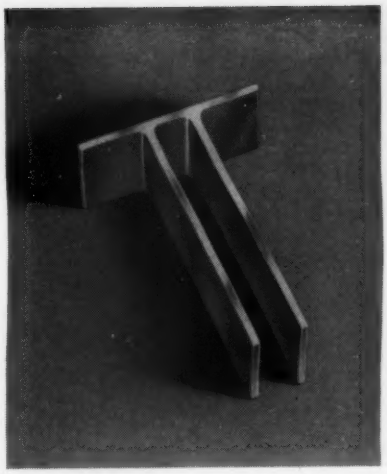
Pipeline Connections

Helpful data on best ways to overcome flexation and vibration problems of Diesel pipeline connections are contained in the new ALLFLEX Flexible Metal Hose Data Sheet #552 just issued by Allied Metal Hose Company, Long Island City, New York.

Thin-gauge Extrusions

Engineering know-how made a seven-to-one tongue ratio possible in thin gauge aircraft extrusions, according to company officials. The complex problem was solved for McDonnell Aircraft by engineers of the White Metal Rolling & Stamping Corp., 92 Moultrie Street, Brooklyn, N.Y. What lends the problem special interest for engineers was the use of White Metal magnesium alloy, ZK60A (one of the most difficult alloys to extrude), in achieving this exaggerated tongue ratio.

Tongue ratio for these and similar parts is figured by the following formula: height of tongue width—b/e. In this case, b—3″, e—.44″ d—1/16″, f—90°.



A new brochure, filled with facts about the properties, uses, and practical application of Whitelight Magnesium is now available from the manufacturer.

Tolerance Accuracy

A bulletin describing and illustrating TOL-CHECK, a new instrument for rapidly checking the tolerance accuracy of surface plates, is now available from the Herman Stone Company, Dayton, Ohio.

TOL-CHECK is a precision instrument that is highly dependable and easy to operate. Its function is to determine whether a surface plate is within the prescribed limitations of accuracy. It does this by visually indicating any overall tolerance deviations on a dial.

Accurate evaluations can be made in 30 seconds, eliminating the need for complicated graphs and paper work required by other checking methods. The unit can be supplied mounted on a rolling stand making it ideal for routine plant inspection programs for any type or make of surface plates.

For a copy of Bulletin 102, or engineering assistance with surface plate problems, write direct to Sales Promotion Dept., Herman Stone Company, 1860 North Gettysburg Avenue, Dayton 27, Ohio.

Power Truck Attachments

A new four-page folder, detailing a complete line of attachments for powered industrial trucks, has just been published by The Elwell-Parker Electric Company, Cleveland.

The free literature illustrates and describes 30 different attachments, all designed for greater truck flexibility and versatility, to cut handling costs to an absolute minimum.

Copies may be obtained from The Elwell-Parker Electric Company, 4205 St. Clair Avenue, Cleveland 3, Ohio.

Vertical Conveyor

Lamson Corporation, Syracuse 1, New York announces the release of a new four page, two column bulletin #205 describing the Combing Vertical Conveyor.

The Combing Vertical Conveyor is the most flexible, compact method of tying together horizontal floor conveyors in a multi-floor building into an integrated system.

Combing Verticals are almost unlimited as to the number of floors that can be served and offer continuous automatic sending and receiving for each floor.

The bulletin may be obtained by writing for Combing Vertical Conveyors #205, Lamson Corporation, Syracuse 1, New York.

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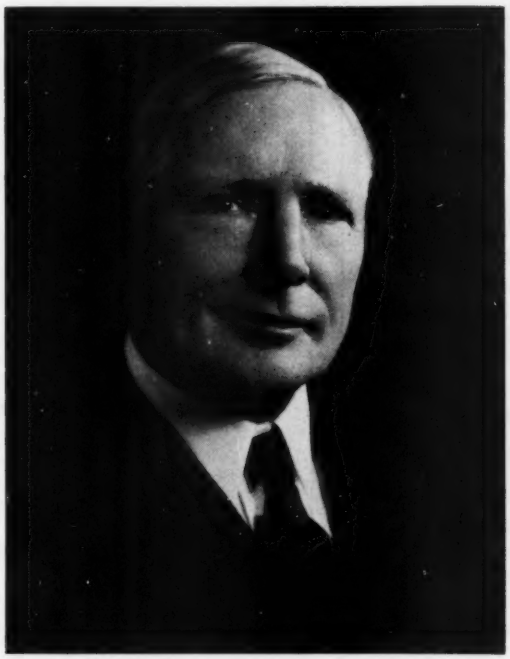

Memoir

of

Harry B. Gear

Died March 27, 1959

The Board of Directors, officers, and fellow members of Western Society of Engineers have lost a distinguished friend. The engineering profession has lost one of its outstanding pioneers. The community, too, has lost a man who gave generously of his time and talents in the public service. All will feel keenly the death of Harry B. Gear on March 27, 1959.

Mr. Gear retired as Vice President in Charge of Engineering, Operating and Testing of Commonwealth Edison Company in 1944 after having served in that capacity for 9 years and after 49 years service with that utility.

A pioneer authority on electrical distribution, he was co-author of a volume on electrical service distribution systems, the first edition of which was published in 1911. He was also a founder of the G & W Electric Specialty Company of Chicago, a manufacturer of distribution specialties.

Mr. Gear served as President of Western Society of Engineers in the year 1933-34 and has been an honorary member since. He was a member of Phi Gamma Delta, a Fellow of the American Institute of Electrical Engineers since 1920 and was a Director of that society in the year 1934-35.

Among his many humanitarian interests were his service as a trustee of the University of Chicago for 25 years and as Board President of Morgan Park Military Academy for 32 years; as a member of the Art Institute of Chicago and Field Museum of Natural History; and as Chairman of the Engineering Joint Committee for a Century of Progress. He served for 17 years as Moderator of the Morgan Park Baptist Church of Chicago. At various times he served as organist, Deacon, Sunday School Teacher and in other lay capacities.

RESOLVED: That this Memorial be recorded in the minutes of this meeting and that the Secretary of Western Society of Engineers send a copy thereof to Mr. Gear's family.

Signed: Titus G. LeClair
Philip R. Elfstrom
Paul A. Westburg

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The Slow Freight May Turn Turtle

The slow freight—delight of the hobo and scourge of the grade crossing—may be less lethargic in the future according to a recent study by Stanford Research Institute, it was reported in Menlo Park, Calif.

One reason for the often inching progress of freight trains is the need to record the number and type of each car in the train. At present this is usually done manually, then telegraphed or telephoned to the next freight yard switch point. Closed-circuit television is also used for this purpose, but the numbers still must be recorded by hand, and the train must move slowly to prevent blurring on the screen.

Under the new system tested by SRI, however, a railroad yardmaster will receive a picture of each train en route to the frieght yard. The picture will be made at an outlying station and flashed within seconds to the next switch point. Armed with this picture, the yardmaster can plan subsequent train makeup and routing many hours before the incoming cars actually arrive.

The basis for the new system is the Videograph Electrostatic Printer, a high speed duplicator based on television principles developed by SRI for the A. B. Dick Co. In place of an image on a screen, the Videograph produces a permanent printed record of what the television camera sees.

To monitor railroad traffic, an automatic television camera is positioned beside the tracks at an outlying station. When a train approaches, floodlights turn on, and the camera records the image of the cars as they pass. The picture travels by coaxial cable or microwave relay to the printing equipment at the freight yard. Here, the signal deposits electrical charges on a continuous paper tape. These charges correspond to the dark areas of the image. The tape is then dusted with black powder, which clings to the charged portions of the tape. Finally, the powder is heated and permanently pressed into the paper.

In addition to tracking trains, the Videograph has other applications. For example, the same equipment can transmit printed material such as waybills throughout an entire railroad network.

The entire Videograph system is extremely rapid — it can duplicate and print out 17,000 elite typewriter characters per second.

The SRI study was carried out with laboratory prototypes, but once a working system is perfected, it will reduce human error in car indentification, cut down switching time, and speed the transmission of both freight and information.

Ground is Broken for New Lab

Ground has been broken for a $1,000,000 research laboratory at the Charles Bruning Company, Mt. Prospect, Ill.

Bruning officials expect the two-story building, which will have laboratory rooms capable of duplicating any atmospheric conditions, to be in operation in December.

The new research center, containing 27,000 square feet of space, will house laboratories, pilot scale production facilities, administrative offices, library, and engineering, drafting and general service facilities. It will be staffed initially by 50 research people, principally chemists, engineers and technicians.

Herbert F. Bruning, president, said the center will consolidate all the company's engineering work with the research activity now conducted at Bruning's Teterboro, N. J., plant. Research has become a management function at the policy level, Bruning added, in order to improve future planning for the company and its products.

Dr. Carl Botkin, recently appointed vice president in charge of research, will direct the new department.

The Bruning Company is a pioneer developer of diazotype copying machines and equipment for general office use and for the engineering and architectural professions. A large part of its new laboratories will be devoted to research in light-sensitive reproduction systems.

Some of the features to be incorporated in the new building include a special two-level lighting system, complete air conditioning, and photographic darkrooms. Provision has been made for an eventual 40 percent expansion of the research center.

Herbert F. Bruning, President of Charles Bruning Company, Inc., wields symbolic first shovel during ground-breaking ceremonies. Bruning executives and construction men observing ceremony are (left to right) Jack F. Johnson; Ralph Beck; A. L. Jackson, MWSE, whose firm is building the new laboratory; Vincent McDonagh; Paul A. Klein, Constructor Supervisor for A. L. Jackson Co.; and Stanley C. Amren.

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C-7604 ARCH. ENGR. BSAE age abt. 30; 5 yrs. exper. in arch. engrg. with some mech. would be advantageous. Duties: Design & supervision of construction of indust. properties of companies own facilities for a mfgr. of lumber products sal. to $8400 loc. Chgo.

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C-7610 A METALLURGIST-TOOLING BS-Met. with some interest in Tool Steels. 0-2 yrs. exper. with tooling program would be helpful. Duties: to develop & carry out a positive tooling program, as a major factor in the production of an increased variety of high quality specially designed fastening devices. Will work independently in this program which will involve tool mat'l. selection; tool & die heat treatment; tool & die life studies; suggesting design improvements (from a met. standpoint) in production of tools, dies & machine parts & considerable trouble shooting sal. $575/600 mo. loc. Fox River Valley, employer will pay the fee.

C-7619 ASST. TO DIRECTOR OF PUBLIC WORKS Grad. CE or equiv. Recent grad. or exper. in field & office on municipal work. Duties: Field & office work on municipal streets, sewers, water etc. under supv. of Dir. of Public Works. Must have good personality & be U.S. Citizen for municipality sal $6000/7800 loc. No. Shore of Chgo.

C-7620 PLANT MANAGER Grad. Engr. age abt. 45; 5+ yrs. exper. in plant management. Duties: to supv. production, tooling welding, metal shop, machining & maint. Recommend & approve purchasing. Must have had exper. in small plant of abt. 200 for a mfgr. of const. mach'y sal. $12000 loc. Ill., employer might negotiate the fee.

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978:MW POWER ENGR. 40 BSEE 11 yrs. in power plant, refrig. & elec. distribution. All but South.

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974:MW PROJECT ENGINEER automotive or controls 25 BSME. 3 yrs. exper. in design and development of small mechanisms including controls. This engineer prefers Midwest or East $7800.

962:MW MECHANICAL ENGINEER Engrg. graduate, with 22 yrs. development of mechanisms, structures in industrial applications, freight cars, automobiles; 8 yrs. mechanical analysis, design, installation, testing aircraft, engines & gas turbines; 13 yrs. supervision.

"Hula Head," a Unique Machining Invention

"Hula Head," a unique invention applying a little Hawaiian dance hip movement to machining of honeycomb structures for aircraft and missiles, was revealed in New York on March 31 by The Martin Company at the opening of the national aeronautical meeting of the Society of Automotive Engineers.

Leon L. Laux, Martin's Baltimore Division chief of manufacturing research and development, described Hula Head as Martin's name for equipment capable of machining compound contour structural shapes from honeycomb core material.

He said it was the first known method of performing this operation within required tolerances and finish without the use of a filler substance designed to rigidize the sandwich-like core during machining.

Laux revealed the new development in a panel address entitled, "Progress in Space Age Materials Fabrication." He also cited parallel developments in brazing of honeycomb structures and said that significant weight savings in the manufacture of fuel tanks for America's newest intercontinental ballistic missile, the USAF Martin Titan, have been realized through chemical milling techniques.

Five-axis Operation

Describing the new Hula Head unit, Laux said it involves a standard three-axis controlled cutting machine equipped with a newly designed portable head and a modified stylus able to convert the cutting to a five-axis operation.

During cutting the stylus, which has five pick-up points, rides the surface of a wooden or plaster contoured model and transmits rise, fall, and tilt motions to the cutter head. The knife edge on the cutter head, in turn, performs duplicate motions in cutting the honeycomb core.

The versatility of motion with which the Hula Head is able to perform, Laux explained, prompted company manufacturing shop personnel, as soon as they observed it in operation, to name the new cutter for the Hawaiian dancers long noted for their versatility of hip movement.

Cutter Head Tilts

The cutter head is capable of tilting plus or minus ten degrees in two directions, perpendicular to each other, and there is a common focal point on the centerline and end of the cutter. Tracer controls consist of a combination of pneumatic, hydraulic and electronic components. Power is supplied by an air motor developing 12,000 RPM.

Laux said the Hula Head has proven very effective in accurately producing both "male" and "female" compound contour honeycomb core sections. The unit was invented by Martin senior manufacturing research engineer, Carlton B. Jenkins, a native of Hagerstown, Md., who has been with the company for 21 years.

The Martin Company also is concentrating considerable attention on adhesive bonding and brazing for fabricating honeycomb structures, Laux told the SAE engineers. He said the company's experience with the resistance electric blanket, as a reliable source of heat in adhesive bonding, has led to an extension of this medium into the higher temperature levels required for brazing.

He said Martin has developed an electric blanket brazing fixture which is a self contained unit incorporating heating elements, cooling system, and associated tooling required to hold and apply pressure to the structure component being brazed.

With the precipitation hardening alloys, the complete brazing and heat treating cycle has been accomplished in 13½ hours as opposed to 34 hours normally required for conventional furnace brazing methods. It has also been found that the electric blanket develops little heat loss, and operates at approximately 65 per cent efficiency as compared to a 10-per-cent efficiency realized with a brazing furnace, Laux said.

Savings in Weight

In another area of progress in space age materials fabrication, he cited weight savings in the manufacture of Titan fuel tanks through use of chemical milling techniques.

At the outset of the Titan design, high strength 2014 aluminum alloy was selected for use in fuel tank construction because of its strength to weight ratio and low temperature properties, although fusion welding of this material was not at the time favorably recommended.

Metal forming processes usually require sections of metal thicker than structural requirements indicate, in order to provide for material "flowing" during the forming process; the Titan fuel tanks, consisting of eight aluminum

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sheet components welded together in a cylindrical whole, were no exception.

Using chemical milling, however, each of the eight fuel panels sheds ten pounds during the milling process, thus providing a total of eighty pounds saved on these skins alone.

Laux said the excellent results obtained on the Titan parts have prompted adaptation of other designs to this new technique, and promise rapid and extended progress in this field. Extension of this process to the fabrication of high strength, heat resistant steel structures is most desirable, and it is anticipated that progress will be made here.

WSE Applications

In accordance with Article 1, Section 5 of the By-Laws of the Western Society of Engineers, there is published below a list of applicants for admission received since the last issue of the Midwest Engineer *magazine.*

William C. Kerndt, attending Chicago Technical College.

Axel H. Magnuson, Sales Engineer, Phelps Dodge Copper Products Corp., 100 W. Monroe St.

Frank B. Maloney, Sales Engineer, Hauck Manufacturing Co., 4659 W. Harrison St.

Herbert Schaible, Engrg. Assist. to the Army Engineer, Hq. 5th U. S. Army, 1660 E. Hyde Park Blvd.

Michael J. Angerame, Design-Assist. Proj. Engr., Chicago Aerial Industries, 1840 Hawthorne St., Melrose Park, Ill.

Ralph C. Reno, Vice President & Editor, Telephony Publishing Corp., 608 S. Dearborn St.

Clifford E. Huntley, Manager-Equip. Engrg., Western Electric Co., Inc., Hawthorne Station.

Zachary Rosenman, Systems Engr., Dept. of R & D Engrg., International Telephone & Telegraph, Kellogg Com. Div., 6650 S. Cicero Av.

Jack E. Garrett, Department Chief, Western Electric Co., Inc., Hawthorne Station.

Raymond F. Faron, Constr'n. Supt., Palumbo Excavating, 2738 W. Harrison St.

Jack S. Dawson, Deputy for Instl. Engrg., 56th Fighter Group, U.S.A.F., O'Hare International Airport, Park Ridge, Ill.

Robert R. Gavin, Field Engineer, American Institute of Steel Construction, Inc., 53 W. Jackson Blvd.

Jozef Cibor, Civil Engineer, Harza Engineering Co., 400 W. Madison St.

George S. Ellis, Consulting Engr., George S. Ellis & Associates, 173 W. Madison St.

George F. Noble, Proj. Mgr. & Vice Pres., Joseph K. Knoerle & Associates, Inc., 211 W. Wacker Dr.

S. C. Hamilton, Vice Pres.-Gen. Mgr. of Sales, Chicago Bridge & Iron Company, 1305 W. 105th St.

Harry Tankus, Chief Engr., Seal Div., Crane Packing Company, 6400 Oakton, Morton Grove, Ill.

A. T. Braje, Designer, Commonwealth Edison Company, 72 W. Adams St.

Donald R. Hudgins, Development Engr., Western Electric Co., Inc., Hawthorne Station.

V. E. Vorhees, Vice Pres.-Sales, Crane Packing Company, 6400 Oakton, Morton Grove, Ill.

Ralph M. McGrath, Time Standards Engr., Western Electric Company, Inc., Hawthorne Station.

C. R. Kolzow, Senior Engr., Western Electric Company, Inc., Hawthorne Station.

Nat L. Levine, Project Engr., Arthur Froelich, Arch's. & Engrs., 203 S. 15th St., Philadelphia, Pa.

Reeve Mulvey, Junior Engineer, The Peoples Gas Light & Coke Co., 122 S. Michigan Av.

John J. Kelly, Deputy Commissioner, Department of Streets & Sanitation, City of Chicago, City Hall.

Joseph Campbell, Contracting Engineer (Sales), Bethlehem Steel Company, Prudential Plaza.

Gilbert E. Sorber, Quality Control Engr., Western Electric Co., Inc., Hawthorne Station.

Ernest Bayer, Engineer, Illinois Bell Telephone Co., 208 W. Washington.

William P. Foley, Jr., Planning Engineer, Western Electric Co., Inc., Hawthorne Station.

Milton M. Lewis, Engineer, Western Electric Co., Inc., Hawthorne Station.

John G. Dempsey, President, Prestcrete Corporation, PO Box 111, Plano, Illinois.

J. E. Meers, Superintendent, Sanitary District of Bloom Township, PO Box 251, Chicago Heights, Ill.

Woodrow L. Brock, Design Engineer, American Bridge Division, U. S. Steel Corp., 208 S. LaSalle St.

Thomas A. Downs, Development Engr., Western Electric Co., Inc., Hawthorne Station.

Lewis W. Hill, Administrator of Plan'g., Community Conservation Board, 320 N. Clark St.

Henry Ericsson Theis, Sales Engineer, Kritzer Products, 5800 N. Pulaski Rd.

Mathew Morrissey, Manager-Chicago Office, Clyde E. Williams & Associates, 30 N. LaSalle St.

Glenn J. Colley, Field Engineer, Sauerman Bros., Inc., 620 S. 28th Ave., Bellwood, Illinois.

Frederick G. Jahnke, Planning Engineer, Western Electric Co., Inc., Hawthorne Station.

Robert J. Langer, Progressive Train'g., International Harvester Co., 7 So. 600 County Line Rd., Hinsdale, Ill.

Robert Smith, Arch'l. Sales Engr., Aluminum Company of America, 520 N. Michigan Av.

John H. Carnell, Assistant Engineer, Illinois Bell Telephone Co., 208 W. Washington St.

Model, Model T Tire

An Army civil servant has discovered that a jeep equipped with Model T type clincher tires can operate in soft mud and sand much better than with standard tires, according to *American Machinist*. He also learned that the removal of two out of every three cleats in tractor tracks increased the tractor's pull at the drawbar by 180 per cent.

New Type Glass

A new type of glass has been developed by a British firm that is said to promise a better and cheaper product for automobiles, buildings, store windows and mirrors, *International Management Digest* reveals. Called "float glass," the new product is reported to combine the high-quality finish of sheet glass with the freedom from distortion of plate glass.

Reservoir and Lake Design Report

Better engineering design of reservoirs and lakes in Illinois is discussed in a report published last January by the Illinois State Water Survey, scientific research division of the state Department of Registration and Education.

The report explains an improved method of predicting sediment in reservoirs to allow location of lakes in areas where lower sediment rates occur. The useful life of a reservoir depends mainly upon how quickly it will fill with sediment.

The report culminates an eight-year study of the deep loess soils of western Illinois and is the first of a series of studies planned for the different soils in the state. Cooperating with the Water Survey in the study were the U.S. Soil Conservation Service and Agricultural Research Service and Illinois Agricultural Experiment Station.

Factors that influence how much sediment accumulates in a reservoir were found to be the gradient of streams flowing into the reservoir, the age of the reservoir, soil erosion of the drainage area, relation between the reservoir capacity and average annual inflow, density of non-incised channels and shape of watershed.

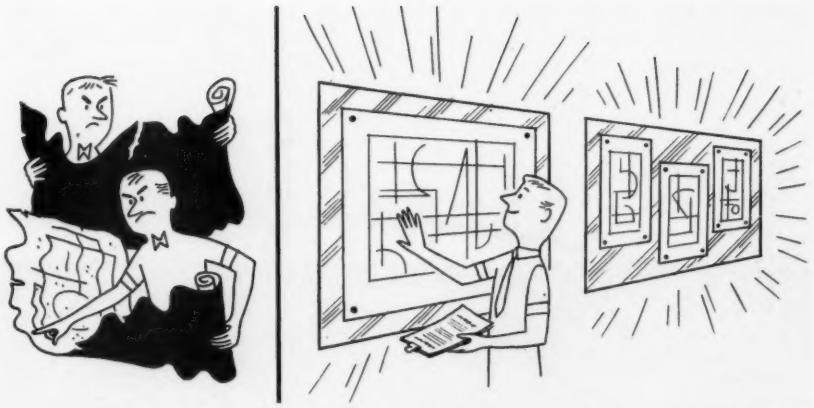
Non-incised channels, the type of drainage channel which is gently sloping and covered by some growth, were found to contribute less sediment. The study shows also that if the drainage area consists of a number of small subwatersheds draining directly into a reservoir, higher rates of sediment deposit can be expected than if there is only one large drainage channel.

Entitled "Correlation of Reservoir Sedimentation and Watershed Factors, Springfield Plain, Illinois," the report was written by J. B. Stall, engineer of the State Water Survey, and L. J. Bartelli, soil scientist for Illinois for the U. S. Soil Conservation Service.

It is available without charge from the Illinois State Water Survey, Box 232, Urbana.

Expensive

A growing child of three requires three times his own weight in food every year, reports *"Food Engineering."*



Blueprints have taken on a new look in the Industrial Engineering Office of United Aircraft Products, Inc., Dayton, Ohio, thanks to an ingenious idea that is the brainchild of chief process engineer, Robert Huesman, and master mechanic, Harry Gersbacher. Tired of handling dog-eared, corner-torn blueprints damaged by thumb tacks and sticking tape, Messrs. Huesman and Gersbacher installed six 48-inch by 72-inch panels of stainless steel on the walls of the drafting room to which they fasten the blueprints and drawings by means of magnets. The panels are made of Type 430 stainless steel sheet supplied by Allegheny Ludlum Steel Corporation. According to UAP engineers, it's easy to see the drawings from any part of the room, and they are preserved in their original condition.

Three-day Language Conference

Western Reserve University and Rand Development Corporation will sponsor a three-day international conference on "Standards on a Common Language For Machine Searching and Translation" from Sept. 6 to 12, at the Tudor Arms Hotel in Cleveland, Ohio.

This meeting will bring together about 60 of the leading information processing systems specialists and designers from all over the world. Expected to participate are specialists from Australia, Brazil, Czechoslovakia, England, France, Germany, India, Japan, Italy, Netherlands, USSR, and Yugoslavia.

Primary purpose of the conference will be to encourage the development of a common machine language or a series of compatible machine languages to prepare scientific and technical literature for searching, selecting, correlating, and translating by automatic equipment.

Efforts will be made to foster agreements for cooperative processing and exchange of research materials to machine search scientific literature on a world-wide basis.

Western Reserve's School of Library Science and its Center for Documentation and Communication Research will be conference hosts. Dr. Jesse H. Shera is dean of the library school.

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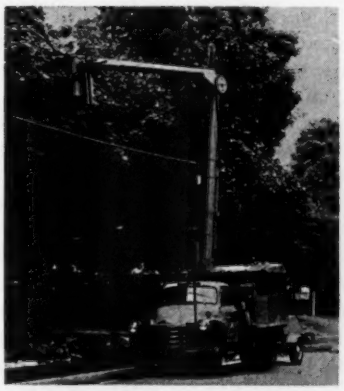

—American Bridge Div., U. S. Steel

Paper by Mackinac Bridge Consultant

Mr. D. B. Steinman, consulting engineer for the Mackinac bridge, has prepared a paper entitled "Modes and Natural Frequencies of Suspension Bridge Oscillations." Because of its length and subject matter, we regret being unable to publish it. However, we understand that copies may be obtained by writing to Mr. D. B. Steinman, Consulting Engineer, 117 Liberty Street, New York 6.

Corrosion Inhibitor May Find Wide Use

Use of sodium molybdate as a corrosion inhibitor in aqueous recirculating systems may find widespread commercial adoption for the first time as a result of a new development by Climax Molybdenum Company, a division of American Metal Climax, Inc.

This new advance — application of sodium molybdate in combination with orthophosphate—now makes it possible to reap sodium molybdate's advantages at a much lower cost than when used alone. Details of this development were reported in a paper presented by Dr. George W. Lewis of Climax' Detroit Laboratories at the 15th annual conference of the National Association of Corrosion Engineers in Chicago on March 18.

Sodium molybdate has been known for some time to be an effective corrosion inhibitor which offers the benefits of being relatively non-toxic and colorless. But up until now its cost has been a limiting factor. In an extensive program which commenced in 1955, Climax found that by incorporating orthophosphate, much smaller quantities of sodium molybdate can be used. At the same time, equally effective inhibitive properties are obtained.

This development is expected to find particularly wide acceptance in equipment where toxic materials can not be used — refrigeration systems for foodstuffs, for example. Other promising areas of application include diesel locomotives, cooling towers, and jackets, recirculating hot water systems, boilers, anti-freeze compositions, and air-conditioning systems.

Extensive tests were conducted in determining the effectiveness of sodium molybdate-orthophosphate inhibitor. Specially prepared specimens of cast iron, 1020 steel and Muntz metal brass were immersed in solutions containing varying concentration of sodium molybdate alone, sodium molybdate plus orthophosphate, and sodium molybdate-hexametaphosphate. Extent of corrosion was then measured by weight-loss, photographic and corrosion current data. The molybdate-orthophosphate combination proved most satisfactory, providing complete inhibition of rusting in tests lasting up to 69 days.

In order to test sodium-molybdate-orthophosphate inhibitor in factual field use, a series of interesting tests have been conducted on some 24 automobiles over a period of 2 years. Cars were well-distributed with respect to age, make, mileage driven and prior condition of the cooling systems. Sodium molybdate alone proved an effective corrosion inhibitor in radiators not previously subject to heavy rusting. Even in the older systems, corrosion was effectively controlled by use of the molybdate-orthophosphate combination. These tests point up the potential of the new development in regard to anti-freeze compositions.

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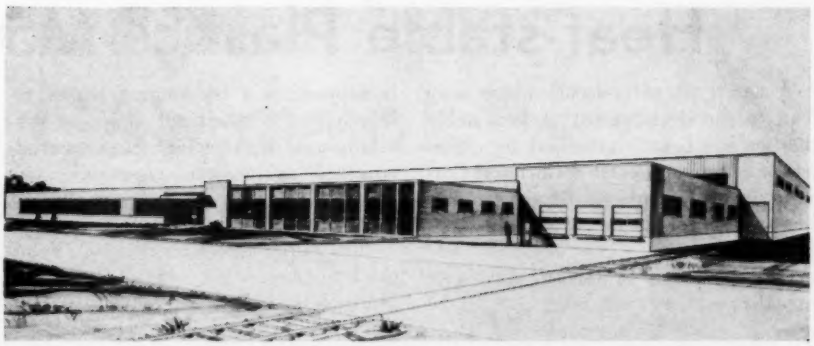
Transformer Corp. Building New Plant

Ground will shortly be broken for a new $500,000 plant for Precision Transformer Corporation at Centex Industrial Park in Elk Grove, Ill. announced M. S. Adler, MWSE, president.

The new plant will be erected on five acres at the intersection of Pratt Blvd. and Nicolas Street and will have a total of 50,000 square feet. Plans for the new structure prepared by Northern Builders, Inc. are designed for ultimate expansion to 150,000 square feet. It will be a single-story fireproof structure with overhead cranes, a railroad siding into the plant and depressed loading docks. The new plant will have outdoor storage facilities for steel and tanks and a large parking lot. Completion date is projected for Spring of 1960.

The move to the new plant at Elk Grove, Ill., a Chicago suburb, will be the fourth for Precision Transformer since it began making transformers in 1950 under the current management. The present plant is located at 2218 West Lake and has 25,000 square feet. In announcing the construction of the new plant, Adler told stockholders: "Present production facilities being overtaxed, as evidenced by orders booked and those turned away, the need for a new plant has become essential. Management is confident that the new plant will result in tremendous savings on production costs with a marked increase in earnings as well.



New plant of Precision Transformer Corp. will be built in Elk Grove, Ill. with 50,000 square feet of floor space.

"The proposed plant when completed will be capable of production in access of $5,000,000 annually. When completely expanded to its maximum size of approximately 150,000 square feet, its anticipated output will exceed $20,000,000 per annum," concluded Adler.

Sales are expected to exceed $2,000,000 in the current fiscal year.

MIDWEST ENGINEER

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Reduction of Outages

A seven-year project to protect New Orleans electric distribution lines from lightning has resulted in a sharp reduction of outages, it was reported in Seattle on June 25 at the Summer and Pacific General Meeting of the American Institute of Electrical Engineers.

"Shielding (using a ground wire over distribution lines) has made a remarkable improvement in service continuity in the area served by New Orleans Public Service, Inc.," M. L. Hurtsell and M. G. West, company engineers, said in a paper describing shielding of 13.8 kv distribution lines. They said that the shielding has been "responsible for the reduction in the outage record of 1.2 per 100 miles per thunderstorm day in 1950-51 to 0.18 in 1958. Based on an average of 75 thunderstorm days per year, this represents a reduction from 90 outages per 100 miles of circuit in 1951 to 13.5 outages per 100 miles of circuit in 1958. One important factor in obtaining this reduction at a reasonable cost is the ideal grounding conditions available in the New Orleans area."

They said that 87 per cent of the transmission system is now shielded and estimated an outage rate of .15 for 100 per cent shielding.

Heat-stable Plastics May Be Near

A new type of molecule which may lead to the development of heat-stable plastics has been synthesized by chemists of American Potash & Chemical Corporation, it was announced at Company headquarters in Los Angeles.

Announcement of the discovery was made by Joseph C. Schumacher, vice president of research, who termed the present results "a significant advance" in the search for plastics capable of enduring operating temperatures far higher than the limits imposed by the best materials available today.

Most plastics today are stable only to approximately 300 degrees Fahrenheit. The current project, it is hoped, will develop plastics that can withstand temperatures up to 400 degrees centigrade or, roughly, 750 degrees Fahrenheit.

Coincidental with the announcement at Los Angeles, a report on the subject was presented at Boston at the national meeting of the American Chemical Society by Dr. Ross I. Wagner and Frederick F. Caserio, Jr. Wagner is project leader and Caserio a member of the team that made the discovery.

The new compounds are based on boron and phosphorus and are known chemically as phosphinoborines. Most existing plastics are composed of carbon compounds, while a few are based on silicon-and-oxygen combinations.

Technically, the newly-synthesized molecule is a "linear chain of repeating, tetracoordinate phosphinoborine units" with a high molecular weight of about 12,500.

At present the scientists have developed two basic types of phosphinoborine materials. One is a translucent, milky white compound that is heat-resistant but is brittle. The other has an appearance much like existing plastics but does not possess heat stable characteristics. Further research is necessary to combine the desirable properties—plasticity and heat-stability—into a commercially-suitable product.

The new materials are the result of four years research by American Potash & Chemical Corporation in cooperation with the Air Force's Air Materials Laboratory at Wright Air Development Center, Dayton, Ohio.

Dr. A. M. Lovelace is in charge of the program for the Air Force, which is supporting a broad program of research and development aimed at providing new high-performance materials required in modern supersonic and advanced air weapons. Lt. C. K. Chiklis is the project engineer on this program.

In making this announcement, Schumacher stressed that additional research is necessary before a satisfactory material that is both plastic and heat-stable can be obtained.

"While materials of immediate practical utility are not yet available from these boron-phosphorus compounds," Schumacher said, "the results which have been achieved by Wagner and his co-workers are a significant advance in the urgent search for materials capable of enduring high operating temperatures."

Dr. Wagner's work stemmed from discoveries at the University of Southern California by Professor Anton Burg who has been conducting basic research on inorganic polymer (plastic) systems for many years in conjunction with American Potash & Chemical Corporation research laboratories and the Air Force, as well as with the Office of Naval Research.

People-to-people Program Pays

The international people-to-people public relations program carried out by Soiltest, Inc., Chicago manufacturer of engineering testing equipment, was announced as a winner of a Certificate of Achievement at the annual convention of the American Public Relations Association. The company's international public relations activity was under the direction of its President, Theodore W. Van Zelst, a member of the Western Society of Engineers.

The award, comparable in the field of public relations to the Pulitzer Prize in the newspaper field, was underscored by the fact that the theme of the association convention was, "Public Relations, Vanguard of Global Understanding."

During the past few years, Soiltest, Inc. has carried on an international public relations activity to both support the People-to-People Program urged by President Eisenhower and to improve communications and sales activities between the firm and its overseas markets. The award recognition given this program attested to its success.

The basis of the program was visitations to many countries in Europe, the Middle East, the Near East, South and Central America and the Caribbean area by Soiltest executives including Thomas McNeil and Edward Brush, Vice Presidents and Van Zelst. The effectiveness of this program was evaluated by Conger Reynolds, Director of the Office of Private Cooperation of the United States Information Agency who said, ". . . This is a real people-to-people activity of the type we are anxious to promote. It multiplies impacts without taking the time of official representatives of the government . . ."

The program involved meeting with hundreds of engineers, professional people, the press and government officials to discuss some of the mutual problems and advances in the field of civil engineering. Films were used to demonstrate examples of the engineering and scientific activities in the United States at a time when this country's prowess in these fields was somewhat dimmed by feats of Soviet rocketry.

In addition to a program of this sort supporting our government foreign policy, it also increased understanding between the company and its many engineering contacts and had a measurable effect on company activity in the various countries.

Soiltest, Inc., 4711 W. North Avenue, Chicago, Illinois, manufactures specialized apparatus for engineering tests of soils, concrete and asphalt. The firm's products are used in 105 countries.

Granddaddy

The granddaddy of today's speedometer, produced in 1904, had three faces—one on the instrument panel and the others mounted on each side of the car, says *American Machinist*. The outside speedometers registered speed in graduated colors, showed flaming red when the car exceeded 20 miles an hour and enabled foot patrolmen who saw the color to nab speeders and back their charges up in court.

TV shows what "goes" ...inside a GAS main!

Engineer adjusts equipment to catch picture of gas main interior on TV receiver in trunk of Company car.

If Emmies were awarded for the most effective uses of TV in industry, here's an application that would be in the running. It's the inspection and repair of gas mains with the aid of a special tube-like TV camera that has its own built-in photo-flood lighting system. As it is slowly injected into a main, the picture of the pipe interior flashes on a television screen in the trunk of a car, shown in the photo at the left.

One important advantage of using closed circuit TV in gas main maintenance operations is that it makes repair jobs much easier by minimizing the amount of digging required. Another is that repairs in a pipe can be given a final "look" when completed to be sure everything is as it should be. Previously, only time could tell whether the repairs were satisfactory. If they were not, re-doing the job was a "must".

This use of TV typifies the Company's forward looking policy of utilizing modern methods and procedures whenever possible to improve operations.

NORTHERN ILLINOIS Gas COMPANY

PROMPT... COURTEOUS ...DEPENDABLE SERVICE

"What can you buy for a penny today?"

MORAL: If your electric bill seems high, it's not because electricity is expensive, but because electricity makes living so much better you're using much, much more of it (actually four times as much as you did a few years ago).

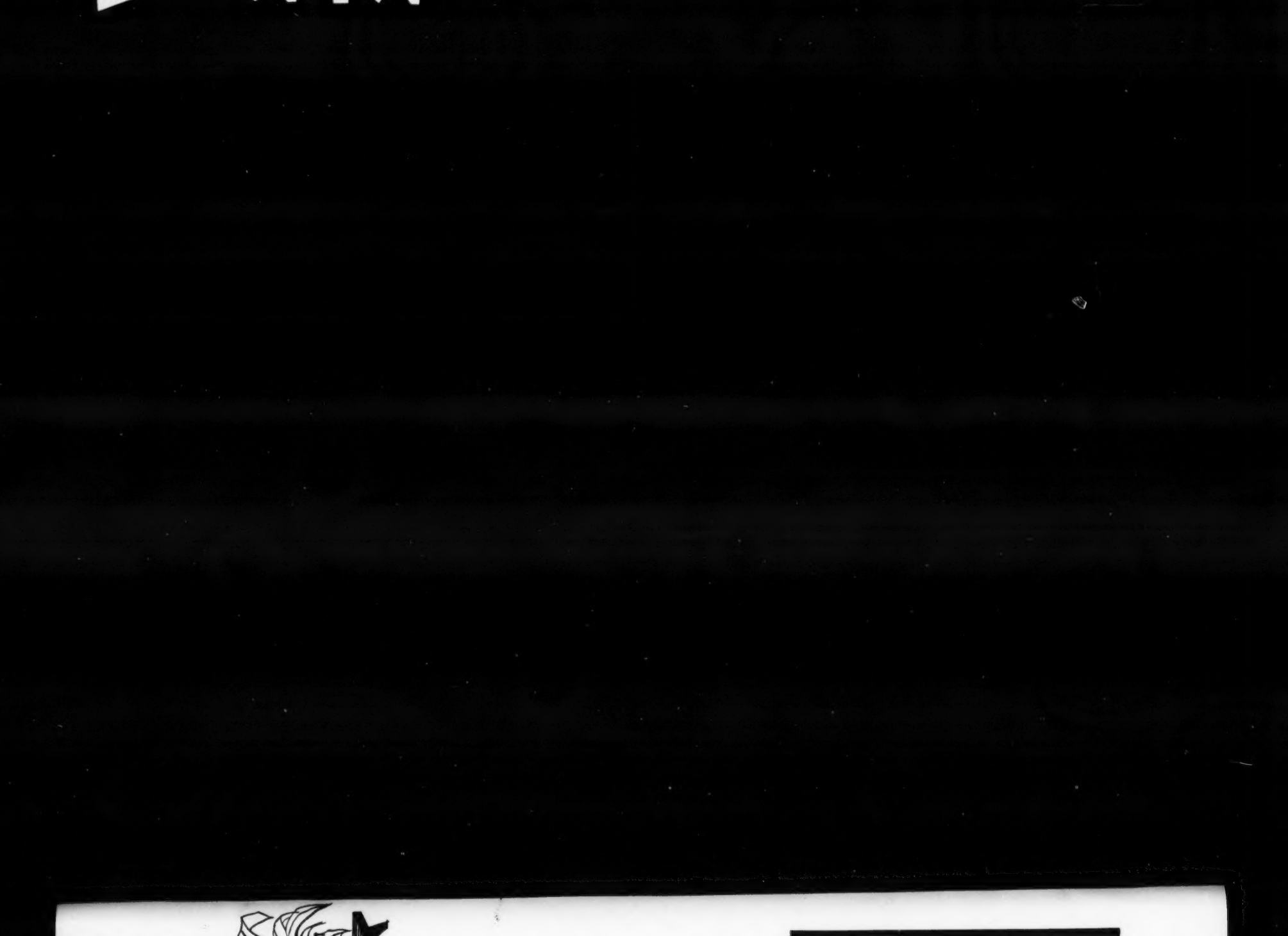
"Electricity costs less today you know...
than it did many long years ago!"

Television

VIEWING

$1\frac{2}{3}$ hours only 1c

(Just one of many penny bargains electricity offers you every day!)

Commonwealth Edison
AND
Public Service Company

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